Scales, networks and uncertainty: an examination of environmental policy-making in Ontario

By

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Abstract

Through a case-study analysis of Ontario's ethanol policy, this thesis addresses a number of themes that are consequential to policy and policy-making: spatiality, democracy and uncertainty. First, I address the 'spatial debate' in Geography pertaining to the relevance and affordances of a 'scalar' versus a 'flat' ontoepistemology. I argue that policy is guided by prior arrangements, but is by no means inevitable or predetermined. As such, scale and network are pragmatic geographical concepts that can effectively address the issue of the spatiality of policy and policy-making. Second, I discuss the democratic nature of policy-making in Ontario through an examination of the spaces of engagement that facilitate deliberative democracy. I analyze to what extent these spaces fit into Ontario's environmental policy-making process, and to what extent they were used by various stakeholders. Last, I take seriously the fact that uncertainty and unavoidable injustice are central to policy, and examine the ways in which this uncertainty shaped the specifics of Ontario's ethanol policy. Ultimately, this thesis is an exercise in understanding sub-national environmental policy-making in Canada, with an emphasis on how policy-makers tackle the issues they are faced with in the context of environmental change, political-economic integration, local priorities, individual goals, and irreducible uncertainty.

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Cheers, to second chances.

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List of acronyms

AFA = Alternative Fuels Act, 1997

BOPI = Biofuels Opportunities for Producers Initiative

CH_4 = Methane

CO_2 = Carbon dioxide

CSR = Common-Sense Revolution

EBI = ecoENERGY for Biofuels Initiative

EBR = Environmental Bill of Rights

EGR = Ethanol in Gasoline Regulation

EEP = Ethanol Expansion Program

ENGO = Environmental non-government organization

N_20 = Nitrous oxide

NGO = Non-government organization

O-EPA = Ontario Environmental Protection Act

OAFT = Ontario Agri-Food Technologies

OEGF = Ontario Ethanol Growth Fund

OEN = Ontario Environment Network

OMAFRA = Ontario Ministry of Agriculture, Food and Rural Affairs

VOC = Volatile organic compound

Chapter 1 – Introduction: setting the stage

In 2005 the Government of Ontario passed the Ethanol in Gasoline Regulation (EGR), which requires a mandatory blending of, on average, five per cent ethanol by volume in all gasoline sold in Ontario. Similar biofuel regulations have been institutionalized since the turn of the century in many industrialized nations (Agra CEAS Consulting, 2006; Rajagopal & Zilberman, 2007).[1] The impetus for these regulations seems to be recent and recurring social, environmental and economic trends including high energy prices, increasing dependence on foreign energy supplies, and the environmental consequences of using fossil fuels (Hill *et al*, 2006). As such, the production and use of bio-fuels links the environmental, energy and agricultural sectors of society (Gardner, 2007).

Through a case study analysis of Ontario's ethanol policy, this thesis studies decision-making and policy development in the context of environmental change, political-economic integration, local economic priorities, individual goals, and irreducible uncertainty. The research questions are as follows: a) given the complex processes of globalization and neoliberalization, and the changing nature of Canadian federalism (see Bakvis & Skogstad, 2008), how can geographers best characterize the spatial nature of environmental policy-making in Ontario; b) how democratic is environmental policy-making in Ontario and c) how does uncertainty shape policy decisions and policy-development?

The following introductory sections will discuss the intended goals of the thesis and the subjectivity of the research. Chapters two and three, respectively, will offer a

[1] The bio-fuel industry has been hijacked by the agri-industry – and has thus influenced it – to such an extent that some feel 'bio-fuels' is a misnomer and these alternative fuel blends would be more aptly titled 'agro-fuels' (Tenenbaum, 2008).

comprehensive literature review and the methodological foundation of the research. Chapters four and five will extend the thesis into the interplay of theory and empirical findings, while chapter six will discuss this interplay and offer conclusions and future research questions (in so much as they can be derived from this study).

1.1 Intended goals of the thesis

First, this thesis will attempt to define the socio- and physical spatial character of environmental policy-making in Ontario by reconciling geographic conceptualizations of scale and network to avoid a one-dimensional, reductionist analysis (Jessop *et al*, 2008). While there has been an ongoing debate regarding the epistemological affordances of one or the other, it is my contention that scale and network are not antithetical, but rather complimentary. In addition to this, I intend to contribute to the 'globalization of policy studies' and studies of policy emulation (see Howlett, 2000; Holzinger & Knill, 2005; Lenschow *et al*, 2005) by developing the concept of a 'scalar premise' to better understand the spatial diffusion of policy ideas and how scale is a category of practice (Moore, 2008).

Second, and largely in conjunction with a discussion of network, the democratic character of the policy-making process in Ontario will be analyzed. Inspired by the insights of David Harvey (1973), I intend to assess the fairness of the decision-making process with regard to ethanol policy in Ontario. This will help determine what role scientific or epistemic communities played in shaping the 'decision environment', in what ways non-governmental organizations (NGOs) influenced provincial policy, and where the spaces of deliberative democracy exist in Ontario (if they exist at all).[2]

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[2] 'Decision environment' is a term I have adapted from Goldstein *et al.*'s (2002) understanding of 'environment' to be shorthand for what the decision-maker *knows* about their surroundings. This is called

Third, the ways in which uncertainty shaped the specifics of Ontario' ethanol policy, and the strategies that are used to deal with such uncertainty, are examined. Though 'expert' opinion is typically regarded as the only source of *a priori* information to deal with a complex situation, it is important to understand how spatial relations are elicited in the policy-making process, and how 'truth' speaks to 'power' in the context of complex and problematic policy issues.

1.2 Addressing my own 'bounded rationality'

"Situated knowledge" is a concept that identifies scientific knowledge as "utopian and visionary" (Haraway, 1988: 585). By situating knowledge in a particular space and time, we recognize that our knowledge comes from 'somewhere', and is 'tainted', which eliminates the notion that our knowledge is a matter of objectivity derived from a 'God's eye view' (Haraway, 1988; Rose, 1997; Pedynowski, 2003). The "mind has its illusions, like the sense of vision" which must be corrected by "reflection and calculation" (Laplace, 1812; cited in Keren & Teigen, 2004: 94). Situating knowledge is a form of reflection and calculation that helps to unmask "embodied" accounts of the truth and the privileged positions from which we make claims to knowledge.

First, I should point out that my interest in the ethanol industry sprouted during my undergraduate studies. The final course of my BAH degree was on the science of land-cover and land-use change. I chose to write the term paper for this course on the effects of ethanol production from a land-cover change perspective. The literature I reviewed at the time suggested that the commitments made toward biofuels at the provincial and federal orders in Canada were misguided. Entering into my graduate

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'choice situation' or 'issue space' by rational choice theorists. Decisions typically adapt to this environment (Gigerenzer, 2002). I will elaborate more on this later.

studies without a concrete idea of what it was I wanted to study, I decided to answer a question that had been picking at me: why did Ontario choose to regulate ethanol ahead of a national mandate, and in the midst of controversy over the effectiveness of ethanol to reduce GHG emissions and dependence on fossil fuels?

The rationale for my choice to study ethanol policy in Ontario also comes from the valuable experience that I perceived would come from this research. Through this research I was able to discuss important and controversial issues with public officials, members of industry, members of NGOs and with my thesis supervisors. A more mundane topic might not have challenged my preconceived notions about politics, geography, and the environment, while a less salient issue might not have afforded the experience of heated yet professional conversations with influential people. Additionally, this research offers interesting insight into federal / provincial relations and the 'political science' of Canadian federalism: I could thus learn more about the politics of my country and my province while studying a decision that I thought was, to put it bluntly, misguided.

Though situating knowledge is a useful way to expose positionality, one can "distinguish the presentation of situated knowledge claims of constructivists from more epistemologically certain claims" (Demeritt, 2002: 782) by addressing the rationality of the research(er). My point of departure is Herbert A. Simon's (1955) theory of 'bounded rationality' (see also Selten, 2002; Klaes & Sent, 2005). Bounded rationality is a response to the fact that rational-choice theory and its mechanisms (i.e., maximizing utility and maximizing expected utility) cannot explain decisions that are made in the real world. Rational-choice theory presupposes optimality, which requires calculations

beyond the affordances of the cognitive capacity of real people, especially when the situation is complex (March, 2006; Elster, 2007). In such situations, the principles of economic rationality are routinely violated. People are not perfect calculators, nor are they entirely self-transparent. As such, we cannot be expected to weigh *desired* outcomes against each other, let alone *expected* outcomes. Ultimately, Simon's bounded rationality was a response to the fact that we need to distinguish between forms of rationality in perfect knowledge situations, and forms of rationality in situations of cognitive overload: the former associated with *perfect* rationality, and the latter with *human* rationality (see also Elster, 1984).

Though bounded rationality maintains that a rational choice is goal-oriented (Over, 2004: 3), it acknowledges the implications of conflicting goals and of the seemingly infinite permutations of choices a researcher can and must make (Gigerenzer, 2004). To overcome these limitations, researchers make use of a boundedly rational 'toolkit' that includes automatized routine behaviour (Selten, 2002), limited search for alternatives (Gigerenzer, 2002) and the use of information shortcuts (heuristics) (Sadrieh *et al*, 2002). This toolkit of a bounded rational individual allows one to cope with cognitive limitations and cognitive overload by simplifying the decision. Bounded rationality acknowledges that decisions are adapted to an environment with the (imperfect and incomplete) faculties a given researcher possesses (see Gigerenzer, 2002).

Acknowledging limited search and adaptation to an environment is particularly relevant when conducting a policy analysis. First, an analyst must understand the vicissitudes of politics and the context in which a policy is developed (Hessing *et al*, 2005). Second, both analyst and reader must appreciate the fact that a policy analysis is

normative, and is thus *prescriptive*, descriptive and explanatory all at once (see Heineman, 1990). Acknowledging bounded rationality admits that I cannot take into account the entirety of the political and policy realm that I am attempting to analyze. My research choices – e.g., who to interview and what indicators to analyze – reflect this fact. These choices are as much a function of my bounded rationality as they are of my personal politics; the latter being more associated with 'situated knowledge'. The methodological chapter will reference the ways in which bounded rationality affected the outcomes of this research.

One should be sceptical and critical of my research not so much because of its subjectivity or situated-ness, but because of its boundedly rational insights. I have tried to make sense of the causal events, knowing that I do not size up well against economical notions of rationality which suggest that I choose the best among every possible option in terms of theoretical, methodological, practical and conceptual issues. Again, this epistemological claim can help "distinguish the presentation of situated knowledge claims of constructivists from more epistemologically certain claims..." (Demeritt, 2002: 782). While all knowledge is fallible, it is not equally fallible (Yueng, 1997). Judging on the basis of how one copes with one's bounded rationality in conjunction with attempts to reveal positionality and 'situatedness' offers an effective way to characterize and evaluate research and the conclusions that are derived from it. Bounded rationality, by focusing not only on the environment in which research decisions are made but also taking into account the cognitive limitations of human researchers, can greatly expand our understanding of what it means to produce 'science'.[3]

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[3] I thank Dr. David Butz for pointing out the seemingly incommensurate ontological assumptions that stem from these two epistemological positions. I will not address these her, but suffice it to say that having a

Chapter 2 – Literature review: building on solid ground

This review begins with work that is closest to my own (i.e., from Ontario and dealing with environmental policy) and moves concentrically outwards (i.e., acknowledging work conducted at the national level). It is limited strictly to policy-studies conducted in Ontario and Canada, because the fact that this policy was passed in Ontario, Canada is more important to this research(er) than the fact that it is a biofuel policy: this research has taken a decidedly domestic approach. As a consequence, I review and engage only those studies that bring, as I attempt to do, 'geographical imagery' to Ontarian and Canadian policy, to better understand its socio-natural spatiality.[4] I conclude this chapter by attempting to justify my own research in terms of its contribution to this literature, its originality, and its practical relevance.

2.1 Environmental policy studies in Ontario

An extensive search revealed that the explicit study of environmental policy-making in Ontario is noticeably absent in the academic literature. Indeed, analyses of provincial policies in general are lacking (McArthur, 2007). This is surprising given that (a) provinces provide almost two-thirds of the services of the government sector in Canada (ibid), (b) provinces have considerable control over land and natural resources, which are both 'environmental' issues, and (c) the considerable regional variation in Canada which is reflected in different forms of development and policy agendas / styles across the country. That being said, the following section shall review the studies in

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'privileged position' from which to see the world (i.e., positionality), and having cognitive and environmental obstacles that limit one's epistemological endeavours (i.e., bounded rationality), imply different suppositions about 'truth' and 'reality'. The intentions of my discussion here, however, were to (a) make my research partial and "locatable" through situated knowledge claims but also to (b) make it more responsible and thus accountable through claims to bounded rationality.

[4] For a fairly comprehensive review of the policy aspects of biofuels in and outside of Canada, the reader may consult Rajagopal and Zilberman (2007).

which the empirical focus is environmental policy-making in Ontario, with the exception of a closely related study pertaining to education policy in Ontario.

Michaels *et al* (2006) examine the role of 'focusing events' in organizational learning and policy change in water conservation. They define a 'focusing event' as a sudden and rare event that exposes a need for policy. It contributes to the creation of a policy window, which is a space in time in which a policy agenda is more likely to be accepted politically and publicly. They use semi-structured interviews and triangulate the responses to determine the most salient events that led to policy changes. While Michaels *et al* effectively demonstrate the relationship between policy solutions and the way policy problems are framed, and the importance of a 'policy-window' in the causal nexus of policy formation, I argue that rhythms and legacies (in "recursive cartography" terminology to be discussed in Chapter 4) are just as important as events are when discussing the causal nexus of public policy. As such, I hope to build on their insights.

The shift from an analysis of government to an analysis of governance in the context of political-economic change has characterized recent policy-analyses in Ontario. Basu (2004) and Prudham (2004) examine political action as a function of neo-liberal reform and the rationalization of its processes; the former in terms of education policy and the latter in terms of environmental policy. These are important works to recognize and review since the processes of 'neo-liberalization' have characterised political and institutional reform in Ontario since at least the days of the 'Common-Sense Revolution' (CSR) under Mike Harris (see Krajnc, 2000; Basu, 2004; Prudham, 2004; Snider, 2004).

Prudham (2004) recognizes that "neoliberalism is inherently an environmental agenda" (p. 357).[5] He critically analyzes the structures that led to tragedy in Walkerton, calling it a "normal accident" of neoliberal reform and a function of "systematic irresponsibility … promulgated by an overarching hostility to any interference with free markets" (p. 350; see also Snider, 2004). The Walkerton tragedy, Prudham argues, was the result of thin policies and hard outcomes that inevitably stem from neo-liberal reform (see Peck, 2001).

Basu (2004) demonstrates that neo-liberal reform is not exclusive to environmental policy-making in Ontario, but is also characteristic of educational policy in Ontario. Basu argues that *neo-liberalizations* are enabled by their appealing rationalization to the general public by conveying rhetorically the message of efficiency, accountability and equity of resources.[6] However, she observes a 'spatial dis-juncture' in the rationalization of neo-liberalism: rationalization at the macro-level materializes itself differently at the micro-level. This was realized in the Walkerton tragedy. Expenditure-reducing initiatives borne out of the 'Common Sense Revolution' were understood as rational at the regional level when considering cost-benefit analyses, but only because the basis of these initiatives did not take into account the indirect costs (i.e., E. coli contamination and subsequent health effects) at the micro-level: savings at the provincial

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[5] Semantically, I take issue with this statement, though the idea is on the mark. I do not think neo-liberalism is inherently an environmental agenda. It is, rather, a political agenda, which *necessarily* has environmental ramifications. To label it an environmental agenda is to state that the processes we recognize as 'neo-liberalizations' (e.g., privatization, re-appropriation of space, market-oriented policies) intentionally target or degrade the environment for its own sake, rather than targeting or degrading the environment as an indirect result of power relations, economic prowess, and an attempt at 'optimality' – or pure rationality – in governance and policy schemes.

[6] Indeed, the *idea* of rationality that neoliberal reform and the CSR advocate has strong normative appeal (see Elster, 2007: 214). I say 'neoliberalizations' to denote the fact that neoliberalism is not necessarily a coherent governance scheme, but can signify a number of political-economic strategies, including (re)commodification and privatization (see Castree, 2008a and 2008b).

level, and theoretically for the tax-payer, had disproportionate costs at the local level (see also Draper & Mitchell, 2001).

2.2 Environmental policy studies in Canada

Canadian environmental policy: context and cases, edited by VanNijnatten and Boardman (2002), analyzes Canadian environmental policy as a function of the political-economic and historical-institutional environment in which they develop. Environmental policy-making is framed in the context of the 'harmonization' of national and provincial standards (VanNijnatten, 2002; Harrison, 2002), free trade agreements with the United States (Hoberg, 2002), economic competition and globalization (H. Smith, 2002) and institutional reform (Doern, 2002; Wilson, 2002). Harrison (2002) examines specifically how the federal-provincial relationship in Canada is consequential for environmental policy. She notes that "when environmental issues are salient in public opinion, both orders of government seek to claim credit from voters for new environmental initiatives" and are thus likely to step on each other's toes (p. 313). As such, federal and provincial efforts are interdependent and policy emulation is a quality of federal arrangements.

The insights developed by Harrison (2002) have been extended by Nancy Olewiler (2006), who puts provincial 'harmonization' under close scrutiny. She states that the *Canada-Wide Accord on Environmental Harmonization* mandated the prominence of stakeholder input in the drafting of all new environmental intergovernmental agreements. This new political environment has been aptly labeled "new public management" (Howlett, 2000), and is consequential for all policy decisions in that more concerns from diverse sectors of society are voiced in the policy-making process, thus making deliberation desirable yet difficult. Indeed, there seems to be a

general shift to more deliberative forms of governance in environmental matters, at least in industrialized nations (Smith, 2003; Chilvers, 2009).

McKenzie (2002) points out that the interconnected neo-liberal economic system is influential in all policy decisions, and thus the federal government – which controls international trade and the negotiation of provisions of international treaties – has more legislative power in terms of environmental decision-making than the provinces. But the constitution is silent on matters involving the 'environment', strictly speaking (Holland, 1996). As such, the two orders of government in Canada have relied on different constitutional authorities: the power of "Peace, Order and Good Government" (also known as the residual powers) and of international trade in the case of the federal government, and Section 92A in the case of the provincial governments, in which they are granted significant authority over the development, management and conservation of their resources (Morton, 1996; McKenzie, 2002; Bakvis & Skogstad, 2008). The general point made by the literature reviewed in this sub-section thus far is clear and is important for my own research: Canadian Federalism and the nuanced relationship between the orders of government greatly influence regional policy-making.

Hessing, Howlett and Summerville (2005) meticulously trace the historical context within which the policy process in Canada is framed, including Canada's predisposition for resource management, constitutional ambiguity, and uncertain international relations. They are clear about the fact that the environmental policy community is 'chaotic' due to a lack of a clear definition of the most pressing environmental problems (Hessing *et al*, 2005: 184). They conclude by asking what the future for natural resource and environmental policy-making might be in Canada. An

analysis of Ontario's ethanol policy might contribute an answer. H. Smith (2002) foreshadows the broad contours of this answer: that environmental policies and climate change policies in particular are more concerned with economic priorities including prosperity and employment than with the true integrity of environmental sustainability. Part of this, Wilson (2002) argues, is because of a lack of coherence in the civil sector, and of the bureaucratization and nationalization of NGOs in Canada which have become more 'routinized' than radical, and less inclined to engage provincial matters.

What I argue is missing from the works reviewed here is the second blade of Simon's (1955 & 1996) scissors: the cognitive abilities and the rationality of the decision-makers responsible for legislative action. It is not enough to analyze the context of a given policy-development, but *what the decision-makers understand about the environment in which they make their decision.* In this way we can focus on the true power of the decision environment: how that power affects the individual and how that power is actually used (see Foucault, 1980). This understanding provides the impetus for much of my research.

2.3 Justification and relevance of this research

Aside from building on the work reviewed above, this research is important given that ethanol regulation is highly consequential for the geography of Ontario. In terms of the material landscape, an expanded ethanol industry will require new bio-refineries to fulfil the mandate set by the EGR. Appendix D illustrates where these have been located. This infrastructure may require new or extended transit and road networks to produce and transport ethanol, given that it cannot be piped due to its corrosive quality. In addition to this, as noted by scholars contributing to the ethanol debate in academia, ethanol

production will result in either, or all of (depending on who one listens to), (1) the use of marginal agricultural land, (2) mature forested areas being replaced with cropland, and (3) compromised wetland ecosystems (see Pimentel, 1991 & 2003; Lal, 2004; Hill *et al*, 2006; Searchinger et al, 2008). Indeed, one cannot dismiss the fact that in the 2007 growing season – the year in which the EGR took force – 465 000 more acres of land were seeded with corn than in the previous year: this represented the highest one-year increase of corn production in Ontario since at least 1908.[7]

Given these infrastructural investments and increases in corn production, ethanol regulation is expected to bring jobs to rural communities (see Kammen, 2006). New markets will open for corn producers while infrastructure will have to be built to produce and transport the new fuel. This will likely change incomes levels – and thus the socioeconomic landscape – in major ethanol-producing regions. Similar effects have been studied in western Canada already. Thomassin and Baker (2000) argue that a large-scale fuel ethanol plant – similar to Greenfield Ethanol in Chatham – increases industrial output by $328.6 million and employment by 1390 jobs.

Cultural geographers concern themselves with meanings attached to landscapes (see Olwig, 2009), and from this perspective ethanol production is perhaps most consequential to the geography of Ontario. Just as the 'corn belt region' of the mid-west United States seems to be the landscape expression of a farming mentality (see Spencer & Horvath, 1963), will a new motorized consumer of corn change this landscape into one that represents and thus incites a fuel-producing mentality? Given that agricultural goods are used to produce fuel as opposed to food now more than ever before, the perceptions

[7] These findings are deduced from the information provided by OCPA who sourced Statistics Canada; see http://www.ontariocorn.org/facts/GrainCorn-acre-yield-production.html.

of agricultural landscapes – and how we behave toward those landscapes –will surely change.

Fully understanding just how this policy will be affect the geography (geographies?) of Ontario is a venture for one who wishes to understand the 'end-of-pipe' impacts of ethanol policy. However, evaluating its 'path dependency' and the people involved will offer very important lessons regarding the environmental policy-making process in Ontario generally. It will allow us to better understand the relationship between perceived policy intentions and real policy outcomes and to uncover contradictions in seemingly inevitable political agendas, while at the same time reveal the hidden story behind changes in the landscape. Therein lays the importance of my cognitively-oriented policy analysis.

In sum, my research targets a recent and heavily debated policy with an array of conceptual, theoretical and methodological tools. Hopefully, this renders it highly relevant practically and academically as geographical scholarship. That Ontario's ethanol policy has yet to be studied by policy scholars and will be highly consequential for the geography of Ontario is enough justification in this researcher's opinion. As will soon be discussed, my methodological tools are prepared to take the complexity of the EGR seriously (Roe, 1998) and may thus inspire other geographers to contribute to a 'thick' analysis of policy decisions (Adger et al, 2003).

Chapter 3 – Methodology

This research can be succinctly defined as a critical, cognitively-oriented case study of ethanol policy in Ontario. My research strategy has three poles: retroduction, abstraction and triangulation. Retroduction is the method by which description translates into the abstraction of possible causes (Yueng, 1997: 60). It is not enough to describe the mechanisms that led to the development of ethanol policy in Ontario. One must also tease out the real (but not immutable or permanent) social and biophysical configurations that have caused it. To isolate these causal linkages, iterative models and iterative abstraction are necessary: iteration is important since (perceived) causal mechanisms may not be exclusive or exhaustive, and context is open and indeterminate. As such, abstraction must be an ongoing process of refinement. Triangulation can help bring rigour to abstract and retroductive strategies. It is a method whereby different research instruments and sources of information are used to compliment each other for the purpose of bringing validity and depth to the knowledge that is acquired, and can also partially overcome the bias inherent in a single method or single-theory project (Meijer *et al*, 2002; Wayne *et al*, 2008). This chapter will describe the broad contours of the analysis as it is framed within these three poles, along with the instruments employed and the methodological scale.

I should note here a distinction I have made between *decision-makers* and *policy-makers*, because at times I distinguish them analytically even though they are cogs of the same wheel. In one sense, I have analyzed the *decision* to regulate ethanol. This is not a matter of policy-making strictly speaking. Rather, it is a matter of setting an agenda for immediate and future policy directions, which involves slightly different processes and

incentives. Given that decision-making in Ontario is executive dominated (i.e., controlled by the Premier or Prime Minister given a lack of separation of powers; see Hoberg, 2002; McArthur, 2007; Bakvis & Skogstad, 2008), and given the difficulty associated with studying these individuals, I relied heavily on context and on those who were close to the decision-makers to understand the genesis and causal nexus of this policy, and to understand the 'decision-environment'.

I was more fortunate collecting information from policy-makers. I define policy-makers as people who act on the decision; they are lower in the bureaucratic hierarchy. Once the decision was made to regulate ethanol in gasoline, these individuals were employed to devise policy options. An analysis of this group of people is no more a matter for 'policy analysis' than an analysis of decision-makers, but I think it is important to distinguish between decision-makers and policy-makers given that the two groups can be analytically separated, and given that decisions are typically executive dominated while policy-making strictly speaking is an endeavour for less powerful civil servants.

3.1 Developing a cognitively-oriented policy analysis

"Policy encompasses the things governments do intentionally in order to achieve change in society" (McArthur, 2007: 240). These political decisions cannot be isolated from their context; it is this insight that encourages a dialogue with institutional and discursive studies. But policy is made by real people; it is about responding to problems and achieving goals. As such, my methodology calls for a 'cognitive turn' in policy studies. Policy studies must take seriously the fact that "people do not have complete information, are not always distance minimizing, are embedded in networks of social relations, and therefore may base decisions on factors other than sheer economic

rationality" (Hanson, 2006: 26 quoted in Strauss, 2008). This methodological commitment will avoid a misconception that ethanol production in Ontario was a 'natural step', was purely the result of structural shortcomings, or was a conclusion preordained by 'hard facts'. It was, rather, the contingent outcome of decisions that were made in the context of a complicated decision-environment.

To develop a cognitively-oriented policy analysis I triangulate qualitative and quantitative research methods to analyze decision-makers' rationality in light of a seemingly 'outside' context.[8] Qualitatively, these include an extensive documentary analysis, in-depth interviews and email questionnaires, which are designed to (1) analyze political developments and other process-related issues, (2) analyze the embeddedness of the decision, and (3) offer participant knowledge to provide policy-relevant insights into human rationality. In addition to this, I have statistically analyzed the relationship of the price of corn (Ontario's primary feedstock for ethanol production) between Chicago, Illinois and Chatham, Ontario. In what follows, I will describe how these instruments were used, relevant procedural issues (e.g., sampling procedures) and the limitations of each.

Documentary analysis

While the Internet has increased informational entropy in terms of academic research (i.e., we know less because there is more to know), it has also facilitated a convenient way to gather information. By querying 'ethanol production', 'ethanol production in Ontario', 'ethanol production in Canada', 'ethanol in Ontario' and 'ethanol in Canada' in the Google search engine, I was able to 'mine' the Internet for relevant data in the form of documents and websites that were related in some way to Ontario's ethanol

[8] Elster (2007) calls this the 'situational factor'.

policy.[9] The analysis included ethanol policy documents, media coverage of various sorts, committee transcripts, up-to-date knowledge of the ethanol industry, government sponsored advertisements, and investment / incentive programs.

These documents contained qualitative and quantitative information that would be unattainable (due notably to time and monetary constraints) via interactive or computational methods. For instance, to attain a broader understanding of the context of spatial and political relations, one must acquire information pertaining to U.S. – Canada agricultural trade relations. To gather empirical data on this issue using interviews or numerical databases would require a lot of time. A document, in this case, is an efficient, coherent piece of information. A notable limitation of this data is that these documents are generally the result of 'grey' research, though the line between 'gold' (academic) and 'grey' is both blurred and contested (see Peck, 1999a; Eden, 2005).

The documentary analysis provided the empirical foundation for my research, and for the questions I decided to ask in my interviews and questionnaires. The quality of one's questions, and thus the quality of the answers one receives, is dependent on how informed one is. Ultimately, good preparation leads to good interviews, and also credibility for future interviews (Goldstein, 2003), and thus a greater chance to generate a larger 'snowball'. This is why my documentary analysis is a significant component of my research.

This point flows into another benefit of a documentary analysis: it helps identify possible interviewees and the central figures that were involved in the decision-making

[9] I chose Google because they index more web-pages than any other search engine available. While I could have triangulated multiple search engines, Google's 'search strategy' – tracking not only the relevance of the title of the page, but the number of times keywords are cited – was strong enough to attain the information I sought.

and policy-making process (Stedward, 1997). This is especially important to this research given that a regulation that attaches itself to a statute in Ontario – as with the EGR and its parent statute the EPA – is developed behind closed doors.[10] This adds a "veil of secrecy" in terms of who is making the decisions (if it is not our elected representatives in the legislature), making these new 'governance' and regulatory regimes a challenge to research (Ward & Martin, 1999; Ludwig, 2001; McCarthy, 2002). An extensive documentary analysis helps one cope with this challenge (other strategies include employing a multiple-snowball sampling procedure and using email to contact a diverse and dispersed population, both of which will be discussed soon).

Interviews

To supplement the empirical limitations of a documentary analysis and the tentativeness and speculation they breed, I attained situated accounts from people who were involved in the policy-making process. This demanded open, flexible and professional discussions with individuals who were close to the ethanol file. In what follows, I will describe my sampling procedure, acknowledge some limitations of the data, and outline the broad contours of my interview structure.

As I am not generalizing to a wider audience, there was no purpose in maintaining a randomized sampling procedure (Tansey, 2007). A purposive sampling procedure – i.e., gathering data from a limited set of actors – was more appropriate (Neuman, 2000). The intentions here are not to gather a large sample, but to gather an *informed* sample: the status of my respondents as valuable research participants depended on their access to the

[10] Those who draft the initial policy are invited 'to the table'. Once a draft document has been completed, open-consultations through the Ontario Environmental Network ensue, where stakeholders have the chance to incorporate their concerns into the policy; it is not debated by elected officials in the legislature, nor is there an open discussion from start to finish.

information I desired, and their contribution to the development of ethanol policy in Ontario. The main difference between a purposive and a randomized sampling procedure is the admitted subjectivity and judgement that is involved in choosing the sample (though it is important to note that a randomized sample is not purged of decisions). As with other seminal decisions that were made with respect to this research, my sample was skewed by my bounded rationality: I had limited time to search for potential participants, I could not make myself aware of all of the participants available to me, and I was working in a political environment that is difficult to penetrate.

To partly counter these limitations, my purposive sampling procedure evolved into a multiple snowball sampling procedure to avoid a path that was dependent on a single individual's view (or a single snowball) with respect to who else *should* participate in the research (Neuman, 2000; Cook, 2006).[11] This continued until a representative population was attained. For the purpose of my research a 'representative population' includes participants from all relevant Ministries and groups of stakeholders that were 'at the table'. Due notably to time constraints and a lack of willingness to participate by many public officials and members of industry, however, my sample was not representative in this regard (see Table 3.1). I wish to contend, along with Goldstein (2003) and Ward and Martin (1999), that the political-temporal contingency of the situation has greatly constrained my empirical endeavours and thus influenced to some degree the analysis of ethanol policy in Ontario.

[11] I also paid careful attention to names that appeared in my documentary analysis and names that were mentioned in my questionnaire responses.

	Interview	Questionnaire

Contacted	18	83
Replied	18	14
Participated	4	3
No expertise	4	5
No time	3	1
No reason	7	5

Table 3.1 Response rates

Since mid – late 2007, the use of food products for fuel production, and the ethanol industry as a whole, has received considerable media attention, very little of which has been favourable. Table 3.2 below is a sample of this media attention. As a consequence, ethanol regulation has been a touchy subject to say the least.[12] Regardless of my attempts at being candid, forthright, and all-around diplomatic about the intentions of my research, the salience of the issue in the media at the time was such that policy-makers were less inclined to participate in research revolving around it. Indeed, only four of the potential 18 participants contributed to my research.

Source	Definition
Bourne, 2007	"It's easy to lose faith in biofuels if corn ethanol is all you know."
Goodell, 2007	"In the end, the ethanol boom is another manifestation of America's blind faith that technology will solve all our problems."
Greenberg, 2008	"Corn prices alone have risen by 70 per cent in the last year. That concern seemed to trump ethanol's ostensible environmental benefits when Mr. McGuinty said he would re-think his government's current policy yesterday."
Libin, 2008	"Turning corn into fuel was seen as a solution to energy and climate problems. Instead, it may be taking food from the world's poorest."

Table 3.2 Recent biofuel media attention

Thirteen respondents were sampled purposively after an analysis of government and media announcements. These individuals – all members from government and industry – were publicly involved in ethanol proceedings and were thus 'close' to the

[12] "The very act of questioning can make a subject touchy" (Wolcott, 2005: 97). As such, my subject is doubly sensitive, because I am asking a question about a subject that is controversial and salient in the media. I have been told by a number of my respondents that my inquiry into the EGR incited a surprising amount of interest from higher level bureaucrats at respective ministries, and became a subject of discussion at subsequent board meetings for the members of industry I contacted. In addition to this, two of the four members from industry that inquired about my research insisted on hearing my rationale for choosing to study ethanol policy before participating, likely as an attempt to detect whether or not my agenda was to place blame (as opposed to "sound" scientific research, as one respondent put it). I argue that such responses are indicative of the sensitive nature of my topic.

ethanol file. Of these initial contacts, only one agreed to participate. Other relevant members – whom I am unable to specify on account of my ethical requirements – declined interviews.[13] Five more potential respondents were generated through the snowball procedure; two members from this group participated, both senior level policy advisors. Those public officials who did participate – including the policy advisors – wanted to review the questions in advance before making a commitment and asked that I refrain from using a tape recorder (which I agreed to).

The four members I was able to interview were very important to the research. In no suggestive order, my respondents were as follows: a former Minister of Agriculture, Food and Rural Affairs in Ontario (OMAFRA), a senior policy advisor with Ontario's Ministry of the Environment, a senior policy / economic advisor with OMAFRA, and the President of Ontario Agri-Food Technologies, a prominent Canadian biotechnology marketing firm based in Guelph. I conducted two separate interviews with the senior policy advisor from Environment. Given these contributions, I argue that although my sample is small, it is also distinguished, which helps to overcome the limitations of a small response rate.

The questions asked throughout the interviews were directed at the specificities of the individual I was interviewing, at the context of my research given pre-obtained information and data, and at the future information I sought to attain. As such, my interviews followed a semi-structured approach, although some of the questions were common to all. This is because I did not have a firm grasp of the decision-making

[13] I think the ability to identify these agencies would contribute greatly to my research. The ethical requirements of qualitative research have limited the epistemological gains I could have made (see Butz, 2008). As public officials who are to be held accountable – and whose job it is to be held *publicly* accountable – I feel the ethical requirements should be different. Unfortunately, political activism, whether based on reality and argued professionally or not, does not seem to be condoned in academia.

process at the time of my interviews since very little information regarding it is offered publicly, and so it was imperative that I remained flexible. In addition to this, I wanted to exploit the heterogeneity of my respondents (see Manheim & Rich, 1995). Indeed, the unstructured interview facilitates meaningful communication and maximizes the flow of information through adaptation. A structured interview, by contrast, would not afford the ability to ask secondary or prompt questions which emerge out of information attained from a given respondent (Dunn, 2000), though it would offer more 'transferability' or 'compatibility' among the answers received (Winchester, 1999). This is not an advantage that I required for the purpose of my project, however. My interviews were guided more by a general objective of reconstruction and retroduction, and by imparting on my respondents the ability to direct the discussion in ways that were important to them, than by a need to collect pre-specified data for quantitative or comparative analysis.[14]

The lack of clear structure and transferability afforded by my interviewing strategy does not imply that my research lacks rigour. I agree with Martin (2001: 197) that "[t]he need for rigour – in the sense of carefully and clearly articulated argument, founded on detailed empirical inquiry and detailed explanation, and involving the identification and causal role of underlying mechanisms and structures – applies equally to all methods". I also whole-heartedly agree with, and subscribe to, the 'analytic turn' in the social sciences, which demands clarity and explicitness (Elster, 2007; Hedstrom, 2005). However – and this is especially true of qualitative methods – one must not

[14] While I was able to circulate questions around a few big issues that I felt were important (practically and theoretically) the context of the discussion was directed, at least in part, by my participants. In a 'two birds with one stone' kind of way, I was able to attain the situated accounts I was pursuing while at the same time empowering and enabling my research participants in such a way that they were more likely to be comfortable with the situation and thus offer more elaborate answers (see Wolcott, 2005). I asked questions in a broad sense (i.e., "How did NAFTA influence this policy?") so as not to 'guide' answers and leave the specifics up to them.

equate structure with rigour. The particularities of my research focus (i.e., decision-making by imperfect individuals in complex decision environments) are such that the identification and explanation of causal and conceptual linkages requires a flexibility that reflects the environment I am researching (i.e., iteration: one of the poles of my methodology). Overall, there is a subjective choice to be made in terms of data collection procedures: when they are non-standardized, hypotheses may not be able to be tested against new data, and if they are standardized, they may fail to reflect a complex and changing reality (Elster, 2007: 59). The particulars of my project are such that I chose the latter and thus worked with a semi-structured interview.

Email questionnaires

Due to the immaturity of online research practices, quandaries and ethical debates are inevitable. This is attributable to the fact that online research lies between many perceived categories such as public / private, writing / speech and identified / anonymous (Madge, 2007: 656). In this section, I will acknowledge some of these quandaries, justify my use of email questionnaires, describe and justify my questionnaire structure and, briefly, describe the limitations of the data.

Many of the aforementioned quandaries are associated with ethical matters, and demand proper 'netiquette' (Madge, 2007: 663). One of the most important matters pertains to the private / public dichotomy in terms of gathering contact information. The organizations and individuals I contacted listed their contact information on the Ontario Environmental Network (OEN). I understood it to be proper 'netiquette' when I used these email addresses. Due to the fact that they were available in the public domain, I assume that they are aware of, and encourage, the use of their contact information by

interested members of the public, of which I am a member: virtual space obscures the private / public binary. When individual email addresses were not made available, I emailed the organization and asked if "this email and my information could be passed along to whom it would most concern within the organization".

The most commonly cited advantage of using web-based research methodologies is that it drastically cuts down on costs and enables a researcher to contact geographically dispersed respondents (Kaplowitz, 2004; Madge, 2007; Wayne *et. al*, 2008; Holmes, 2008). This was helpful considering my position as a student with limited time and funding but high ambitions and aspirations for my research. Email cuts down on paper / postage costs, and also on the time it takes to send a letter of invitation, consent form, and then the questionnaire. In hindsight, I feel fortunate to have conducted this research in the 'age of the Internet'.

While I am not substituting efficiency for quality, another advantage with email questionnaires is that, when completed digitally within the very same file that I sent the unfinished questionnaire in, transcription comes 'ready made'. The questionnaire was written in Microsoft Word, which is a common word processing system with which most people work. Participants were asked to inform me if this document was not compatible with their system, and the file was reformatted if that was the case. Once these particulars were worked out, participants simply re-attached the completed questionnaire with their answers located directly under the given questions. This made transcription easy, because it was already digitally prepared and nicely laid out. I then coded these answers based on my theoretical and conceptual lenses: scale, network, democracy and uncertainty.

The sampling procedure was two-fold. The Ontario environmental policy-making process is influenced by the Environmental Bill of Rights, which ensures that policy drafts are made available for public scrutiny. The forum for such discussion is administered by the Ontario Environmental Network (OEN). I contacted an OEN coordinator to ask if a list of NGOs that had made comments on the initial draft policy was available, and he subsequently offered to refer my information to the entire network.[15] This includes approximately 950 NGOs and 50 government organizations, for a total of approximately 1000 organizations. I then contacted 83 NGOs from this list personally, to ensure that those who I felt would be most compatible to my research were contacted and offered the chance to participate.[16] As such, my sampling procedure was purposive and supplemented by a snowball strategy, and generated a sample size of approximately 1000 organizations (though I use a sample size of 83 given that there is more certainty that these 83 groups were actually contacted).

An obvious limitation to using web-based research is that participants who do not own computers, or possess an email address, are overlooked. This is an unfortunate reality of this type of research, which could be deemed 'elitist' in the sense that it privileges those with such resources. That being said web-based strategies are compatible with my research intentions. If I were studying the effects of the ethanol industry on the landscape, I would be incapable of completing the bulk of research from the 'armchair' position that a documentary analysis and email questionnaires afford. I do not mean to underestimate the 'fieldwork' that went into my research (which itself is a contested term; see Passaro, 1997), but to acknowledge the fact that the particularities of

[15] I was also sent the hardcopy version of the comments that were made on the Registry, which I analyzed.
[16] I determined this largely by their name and the issues they dealt with, both of which were offered on the OEN website in the personal descriptions they offered.

my research allow for, and even encourage, web-based strategies that other research might not. Documents are more readily available on the Internet than ever before, and the group of people that I am attempting to contact are generally familiar with, and have access to, web-based resources such as e-mail.[17]

As the reader will notice the questionnaire data is used sparingly (to say the least) throughout the empirical analysis. This is due mostly to a remarkably low response rate (17 per cent) and an even lower participation rate (0.05 per cent). I encourage the reader to refer back to Table 3.1. Surely, a much stronger response rate was anticipated. At the time the letters of invitation were distributed, ethanol production was heavily debated, highly controversial, and was being contested on both value differences and scientific deficiencies. Further, my contact information was (as far as I know) distributed to every member of Ontario's Environmental Registry, and I followed up to 83 of those agencies, and so my potential sample was large. Given the controversy surrounding ethanol policies and given that ENGOs are groups that represent the public on environmental matters to fill the gap left behind by government and industry, I assumed that questioning ethanol in a convenient digital questionnaire would incite a high degree of enthusiastic responses. I had visions of analyzing a response rate in the range of 30 – 50 percent. This prediction proved to be as naïve as it was erroneous.

Only 14 agencies responded to my letter of invitation. Of those, five cited 'lack of expertise' on the subject. This included agencies whose actual expertise is at least indirectly related to ethanol: agricultural land preservation, air pollution, climate issues and so forth. Additionally, of the 26 agencies who commented on the draft policy, only three were ENGOs. This is remarkable given that passing an environmental policy is not

[17] John McCain is the only public official I am aware of that has yet to learn how to send an email.

an everyday occurrence; it is not as if the EGR was simply 'white noise'. Most interviewee participants commented on the fact that ENGO involvement was not minimal, but incidental. There was little ENGO backlash and little involvement altogether. Given that very few agencies commented on the policy through the environmental registry, and that those who were close to the policy could not attribute any meaningful involvement to ENGOs, I argue that the best explanation for a low participation rate is a lack of expertise on the subject matter.

The low response and participation rates can also be attributed to the tactics I employed. As previously stated the most cited benefit of using email questionnaires is that they cut down on time and allow a researcher the opportunity to contact geographically dispersed populations. While this is true, it seems that potential respondents are no more inclined to respond to emails than to paper letters, regardless of the convenience associated with digital questionnaires. In some cases, this can be attributed to the 'distance decay' effect in terms of obligation: the distance between me and the respondent, and a lack of more personal communication, may reduce any feelings of responsibility or obligation to participate in my research (Madge, 2007: 668). Additionally, one must account for invitations being sent to 'junk mail' boxes, or being lost in the noise of full inboxes with more pressing matters. In any event, emails are perhaps too informal and unreliable.

A small disclaimer: further limitations of my interview and questionnaire data

The first limitation of my interactive data is a function of sample biases, mostly related to limited time and access, and of the political-temporal contingency of the ethanol situation. Non-responses are a form of non-random error, generated by overlooking important individuals or being denied access to important individuals (Goldstein, 2003). This non-random error skews data and findings in as much as it leaves 'missing pieces' to the puzzle that is being reconstructed and analyzed. However, these non-responses have significant explanatory value. In particular, they highlight the controversial nature of ethanol policies and the noticeable absence of ENGOs who are supposed to serve as a check and balance on the environmental policy-making process in Ontario (I will discuss this more in Chapter 5). In any event, the relatively small number of participants was compensated with meaningful discussions with key players and little time wasted during the interviews, and an adjustment to the project made in light of the low responses to the questionnaires.

In addition to non-responses, interview data comes with response biases in as much as answers are polluted by (1) my respondents' memory lapses (Tansey, 2007) and a hindsight bias as their current belief may be altered by the outcome of their actions (Hoffrage, 2006; see also Elster, 2007)[18] and (2) the controversial nature of my research topic. Given the latter, respondents are inclined to answer questions in a 'political' manner rather than being direct, explicit, and accountable. As such, "the search for a policy's genesis is futile" (Michaels *et. al,* 2006: 985). Tetlock (2002) offers a functionalist-framework (see Table 3.2 below) to make sense of this, by categorizing the adaptive behaviour observed in an interview setting with public officials. What is most

[18] Indeed, "Social actors … may be trapped in false consciousness, unable to explain truly and to account fully for their action" (Yueng, 1997: 63).

important to this discussion are 'people as pragmatic politicians' and 'people as prudent prosecutors'. One is likely to revert to the former when under evaluative scrutiny while simultaneously being held accountable for their actions. As a 'prudent prosecutor' it was my job to search for the 'truth' in as fair a manner as possible.[19] This meant that my questions were personal at times, most notably in terms of relationships with non-governmental organizations and with the decision itself. I also asked questions that would force my respondent to offer information about some other agency or some other individual. Given that the respondents are accountable to these people / organizations, and that the information they offered would be published in some capacity, they inevitably diluted the information I was given by answering in a very round-about manner, thus acting as 'pragmatic politicians'. Ultimately, when self-interests are engaged and issues of accountability are implicit, people are most likely to act as pragmatic politicians.

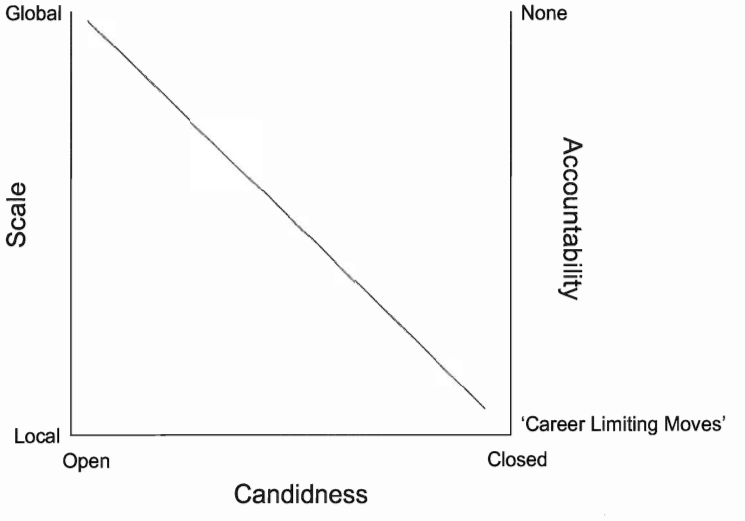
Table 3.3 Tetlock's (2002) functionalist framework.

Metaphorical framework	Function and behavioural strategies of coping with challenges
Intuitive scientist	Driven by epistemic goals; update knowledge and engage the world with eyes-wide-open
Intuitive economists	Driven by utilitarian goals; optimize choice
Pragmatic politician	Coping with accountability; devote mental energy to generating reasons why they are right and would-be critics are wrong; control information they offer.
Prudent prosecutors	Enforce norms; commitment to procedural fairness and flexible self correction; sensitivity to contextual cues.

[19] As a critical geographer I walk the fine line between academic and activist (see Ward, 2007) and in that sense am a prudent prosecutor. However, I am also an intuitive scientist, intent on producing knowledge and uncovering mysteries. Additionally, as an intuitive (though boundedly rational) economist, I balance the goals of producing this knowledge in as intelligent a fashion as possible while still completing my thesis in reasonable time.

I wish to extend this theory and argue that the prosecutor – politician relationship is structured by the scale at which questions are directed. The questions that I asked pertaining to the *context* in which Ontario's ethanol policy was framed (e.g., the regulation's relationship to NAFTA) were answered readily. However, when I asked questions regarding personal beliefs, preferences, and interpersonal affairs, I struck a wall built with answers such as "I can't give you their names" or "off the record I can say that …". This indicates a relationship between scale and truth that manifests itself throughout the course of the interview, and thus a geography to the answers an (accountable) interviewee is willing to divulge. When the issue is far from personal responsibility – i.e., when the issue is scaled globally or internationally – it is easy to acquire data through interviews. The closer the questions get to the scale of the body, the less information the interviewee is willing to offer. This relationship is mediated by accountability and what members of any bureaucracy would call 'CLMs' (career limiting moves) – a term used by one of my respondents. The relationship between scale, accountability, and candidness of responses is illustrated below.

Figure 3.1 The relationship between scale, candidness and accountability.



While it may be true that a policy's genesis is impossible to unveil, it is still possible to retrace causal arrows as they apply to the policy-making process, by way of (a) retroduction, or reconstructing the decision environment to determine how best to characterize it and its relationship with the policy outcome, (b) iterative abstraction to ensure that refinement and the interplay of theory and findings are taken seriously, and (c) the triangulation of multiple methods, and the triangulation of multiple respondents, to bring rigour to the analysis (Denzin, 1970). This is why I argue that the three poles of my methodology are strong. I submit that, given the significant limitations of access to information involved in a policy analysis of the sort I am conducting here, and the complexity of the policy and political realm, these three 'poles' can help bring rigour to policy analysis. Additionally, it helps to triangulate qualitative with quantitative research methods and findings.

An analysis of the price of corn between Chicago and Chatham

I chose two grain elevators from relatively similar locations from which to analyze differences in American and Canadian corn prices. Chicago and Chatham are at the heart of well-established ethanol industries, highly lucrative agri-food industries, and highly productive farm land. The conclusions derived from this analysis will help determine the extent to which corn prices and the economic relationship with the U.S. had on Ontario's ethanol policy. My working hypothesis for this analysis is that the price of corn between the two sites is highly correlated, and that they both decreased significantly after 2002 when corn production in the U.S. was highly subsidized as per the 2002 Farm Bill approved by Congress.

The quantitative methods were chosen based on, the information they would provide and the characteristics of the data sets and subsequent assumptions that can (or cannot) be made about the populations from which they came. The data sets consist of weekly prices reported at their respective locations, adjusted to Canadian dollars per metric ton, and were attained via email correspondence with *Agriculture and Agri-Foods Canada* (AAFC). While I had no control over how the data were selected, nor could the anonymous representative from AAFC inform me of the selection process, it is safe to assume that they are unbiased and thus random. Each price paid (that is, by whatever link of the agri-business chain that purchased from the respective grain elevator) had an equal chance to be selected as part of the weekly report, and every price paid was not necessarily pre-determined, or intended to fit into a framework.

The first step was to determine the relationship between the prices in Chicago and Chatham for the time period between January 1996 and February 2008. While the data exhibit a slight positive skew, careful analysis showed that the distribution was very close to normal.[20] This satisfies the assumptions for Pearson's product moment correlation coefficient (r), which I use to describe the degree of correlation between the two sets of prices. The null hypothesis (H_0: $r = 0$) states that the two sets of measurements are random samples from two independent, normally distributed populations. Any indication of correlation is merely due to chance in the sampling procedure. The alternative hypothesis (H_A: $r \neq 0$) states that there is a correlation between the two variables. Because my working hypothesis is that the prices are significantly and positively

[20] The 68-95-99.7 rule was satisfied at each location, and the distribution appears normal based on a frequency distribution (see Appendix A: Figure 2). Furthermore, the data set is fairly large (n=634), and larger data sets tend to distribute themselves normally.

correlated, I have applied a one-tailed test. As such, Pearson's r_{crit}= 0.195 for df = (n-2) = 1264, $\alpha < 0.05$, one tailed (Ebdon 1985: Appendix C).

Correlation indicates two things. First, it tells us that high and low values from one variable are paired with high and low values from another. Second, it tells us the strength of this relationship. In addition to understanding the level of covariance, it is also important to learn how the prices that vary together compared through the time. For this, I applied a Student's t test, again noting that the data are normal. The validity of this test rests on the assumption that the standard deviations of the populations from which the samples were taken are equal (Hammond & McCallaugh 1974: 169). This can be determined by the variance ratio ($F = \sigma_1^2 / \sigma_2^2$) where σ_1^2 represents the greater estimate of population variance (Chicago = 1168.21) and σ_2^2 represents the smaller estimate of population variance (Chatham = 972.49). Because F_{crit} = 1.7, $df_{1\&2}(633)$, $\alpha = 0.05$ and F_{calc} = 1.2, I am able to conclude that the difference in sample variances may be regarded as being due to chance, and can thus apply the t test.

The null hypothesis states that there is no difference between the means of the populations from which the two samples were taken, and any observed difference is merely due to chance in the sampling procedure (H_o: X = Y). The alternative hypothesis states that there is a difference between the populations which is accurately reflected by the samples (H_A: $X \neq Y$). Because a high degree of correlation has already been assumed and the degrees of freedom are 'off the chart', the data were tested at $\alpha < .001$, two tailed, to bring rigor to the analysis. Therefore, t_{crit} = 1.65, df = (n-1) = 1265, $\alpha < .001$, two tailed, noting that comparison, not direction, matters.

Of supreme significance to this research is how the means of corn price at each location changed after the 2002 fiscal year was complete, and the revised Farm Bill signed by the United States Congress took full effect. The data were divided accordingly (T_1 = January 1996 – December 2002, T_2 = January 2003 – February 2008). While the data remained unbiased, other assumptions necessary for parametric testing could not be safely inferred. Therefore, the data were converted into ordinal format to apply the Mann-Whitney *U* test, which is a powerful test where the normality assumption is no longer necessary (Cooper & Weekes, 1983). The null hypothesis is that the two distributions are identical and taken from a common population, with any difference due entirely to chance in the sampling procedure (H_o: $U_{T1} = U_{T2}$). The alternative hypothesis states that the two distributions differ with respect to their mean. Because my working hypothesis is that the price of corn fell significantly after 2002, it is written as (H_A: $U_{T1} > U_{T2}$). Therefore, U_{T1} was used as the test statistic. Given that the *n* values are high I am unable to refer to the tables which offer critical values for *U*, and must instead establish significance by use of a *z* score. This is acceptable because the distribution of *U* approaches normal as the size of the sample increases (Hammond & McCallugh, 1974). The *z* score was calculated at both locations at $\alpha = 0.05$, two tailed, using the following formula:

$$z = \frac{U - \frac{1}{2} n_1 n_2}{\sqrt{\{(n_1)(n_2)(n_1 + n_2 + 1)/12\}}} \quad \text{Formula 1}$$

3.5 Methodological scale: collapsing contexts into the unit of analysis

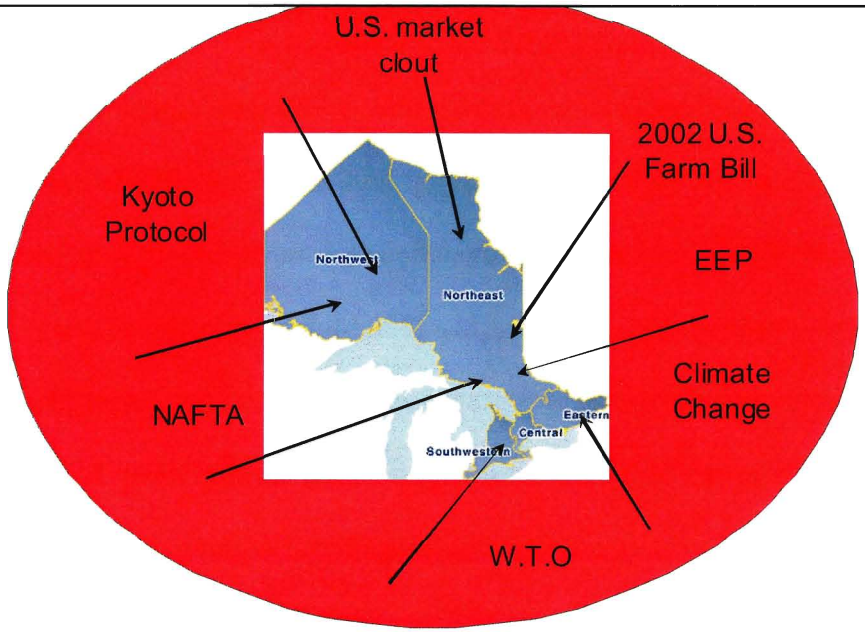
Methodological scale "relates to the researcher's strategy of dealing with her research area" (Simandan, 2005: 52). There are significant epistemological implications in one's choice of scale. Regardless of the scale chosen, a researcher must close some

horizons for the purpose of focusing on others (Simandan, 2005 & 2006; consider also that researchers are 'boundedly rational'). When analyzing a phenomenon in a global context or from a global perspective, geographers run the risk of neglecting smaller-scale processes, and vice versa. These epistemological difficulties are defined by the 'modifiable areal unit problem' which is a term most associated with GIS, but has relevance in all geographical studies (see Wong & Lee, 2005: 7). Essentially, how we partition space is not a natural partitioning, and there are processes or events that may transcend these boundaries and affect our conclusions. It is difficult to generate results that are consistent across spaces (i.e., scale effect) or zones in a particular space (i.e., zoning effect). Given this, it seems most appropriate to conceptualize the scale of the research in operational terms.

Given that the analysis here is of regional policy, which cannot be made to apply outside of Ontario, it is most appropriate to choose Ontario as the unit of analysis. To avoid neglecting processes at other scales, the contexts that are necessary to answer the research questions are collapsed into this unit (see Simandan, 2005 & 2006 and Figure 3.2 below). My epistemic horizons – which are necessarily limited given that I am boundedly rational and can paint only one picture at a time – go beyond Ontario in recognition of the fact that Ontario is not a closed container that can be examined in isolation from the rest of Canada, or from the rest of the world. Policy-making is not a large scale or a small scale venture; it is cross-scale (Adger *et al*, 2003). A policy analysts' strategy must reflect this: one's observational scale should serve, as mine does, as only a spatial entry point into understanding how various phenomena are correlated and interdependent, how policy is a reflection and a result of this topological relation, and

thus how policy at one political scale shapes and is shaped by operations from other scales.

Figure 3.2 The context, represented in red, is collapsed into my unit of analysis (Ontario). Map supplied by the Government of Canada.



Chapter 4 – The forest: theories of space, democracy and uncertainty

4.1 Theories of space

> "Recognizing the several ways in which the [many] dimensions of sociospatial relations can be analyzed in self-referential terms and in terms of their interactions, is crucial to avoiding one-sided, reductionist analyses."
> -Jessop *et al*, 2008: 396; my emphasis

Broadly speaking, Geographers submit that the spatial organization of social and biological phenomena has significant descriptive and explanatory power. Given the complex processes of globalization and neoliberalization (see Amin, 2002; Peck & Tickell, 2007), and the changing nature of Canadian federalism (see Bakvis & Skogstad, 2008), how can geographers best characterize the spatial nature of environmental policy-making in Ontario? In an effort to set the stage for the answer to this question, I shall briefly summarize the ongoing debate in geography pertaining to spatial theory, and how the fruits of the debate can be harvested.

From one corner of the discipline, spatial organization is characterized in scalar terms. Co-constitutive and interdependent geographical delineations (scales) serve as content and context for geographical inquiry (N. Smith, 2000). Prior to the political-economic tradition in geography, scales were understood to be 'closed containers' and 'scale' was synonymous with 'level', though since at least the 1960's 'scalists' have been theorizing about the intrinsically relational character of scalar processes (Brenner, 2001; Sayre, 2005 & 2009). Others have been elucidating space as socially constructed; extending this notion to argue that scale is fundamentally an epistemological construct (Marston, 2000; Kurtz, 2003). Regardless (as a result?) of these reflexive, relational and radical approaches, there are three main concerns with scalar theory: (1) it tends to encourage the epistemic fallacy, (2) it predominantly focuses on the capitalist production

of space and (3) it reifies a micro-macro binary, while neglecting small scale processes when the observational scale is large, and large-scale processes when the observational scale is small (Martson *et al*, 2005; Moore, 2008; Woodward *et al*, 2008). Essentially, many argue that a focus on geographic scale falsely and inadvertently represents an a priori spatial arrangement and thus "takes for granted a spatial and scalar hierarchical relationship" (Peck, 2004: 308).

In response to these criticisms, non-modern theorisations rooted in a flat ontology – which draw predominantly from actor-network theory – have been developed (see Marston *et al*, 2005; Jones *et al,* 2007; Woodward *et al*, 2008). The basis of this paradigm shift is to explain the contingent manner of spatial organization and spatial relations and to 'rob' entities that make up reality of their stable, given, and universal character (Mol, 1999). The focus is on 'place-based' organizations of spatiality and the social construction of space through the action of networks. 'Sites' are favoured as the unit of analysis as opposed to 'scales' in an attempt to dismantle the structural and mechanistic framework that a scalar ontology seems to impose: it is an "ontology composed of complex, emergent spatial relations" (Marston *et. al*, 2005: 422). It is a theoretical approach that has been used to characterize the shift from 'government' to 'governance' and the subsequent alleged shift in the spatiality of political power from the vertical to the horizontal (Lane & Morrison, 2006). There are common arguments against a 'flat' theory, however: (1) although 'flatness' can be situated (see Jones *et al,* 2007), such theories fail to recognize and pragmatically characterize spatial 'assemblages' that are formed by successive recurrence (Escobar, 2007) and (2) they do not adequately account for spatial power relations, or executive decision-making. As

such, those who favour a flat ontology fail to clearly articulate and account for the very real influences non-site-specific conditions have on the sites they study, making causal linkages difficult to flesh out (Jonas, 2006; Escobar, 2007). Many are not as eager as flat ontologists to dismiss scale from the geographical lexicon (Prytherch, 2007 & 2008).

The theoretical approach I develop below is in response to this debate. My approach attempts to reconcile mechanistic (i.e., conflating scales with determinant levels) and contingent (i.e., replacing 'scales' with 'sites') theorizations of space. I argue that geographers need to understand scales as relational without flattening socionatural spatial relations in a way that causal arrows and directive forces are veiled. To do this, both scale and network need to be employed as conceptual and theoretical devices for geographical inquiry. By incorporating more than a single geographical concept into explanations of policy-making, we can harvest the fruits of the debate above rather than allow it to paralyze or further separate geographical scholarship.

The following theoretical approach will bring together spatial theory, political theory and cognitive theory.[21] First, I will introduce 'recursive cartographies' (see Simandan, 2005 & 2006). The purpose is to explain that while policy has a political spatial extent (scale as size), it is not isolated from, nor inside/outside of, legacies, rhythms and events at other scales (scale as relation). By examining how these legacies, rhythms and events are consequential for policy-making, I explore the ways that scale is a pragmatic technico-epistemological device. Second, by developing the concept of a *scalar premise*, I contribute to theorizations of the 'globalization of policy-making' in

[21] To develop a relational theory of scale it is important to bring together different disciplines that are predicated on different scales (Sayre, 2009): cognitive theory examines the scale of the body, political theory examines the scale of the state, and the geographical theory I draw on and develop has the ability to bring them together intelligibly. In essence, "scales are embedded in the theory and method of different disciplines" (Dovers & Price, 2007: 47).

terms of how scale, as a frame that tries to make sense of geographical phenomena, is performed by human actants through the re-articulation and reworking of spatial relations.[22] Lastly, I will explain why scale and network are both required to examine and understand the policy-making process.

Recursive cartographies: scale as a category of analysis

The interplay of legacies, rhythms and events give rise to particular spaces (Simandan, 2005 & 2006). A legacy is defined as the crystallization of past rhythms and past events; it comprises things that seem to be 'dead' but continue to have agency, silently shaping the material landscape. An example is the soil structure of a given area. Continuous erosion of rock structures (which is an example of a rhythm) and a volcanic eruption that creates igneous rock formations and particulate fallout (which is an example of an event) are a small part of the spatial (re)configurative processes that coalesce to create the legacy of a given soil structure. Soil structures, in turn, dictate vegetation patterns, drainage patterns, and other biophysical aspects of an area, and thus silently shape the landscape. Rhythms can be defined as phenomena that regulate and bring consistency to space (Simandan, 2006: 69). An example of a rhythm would be the day/night cycle, the changing of the seasons, or modern-day agriculture. They exist on shorter time scales than legacies. And while rhythms "weave the fabric of space", they are challenged in their hegemonic ability to do so by events. An event is understood as a perturbation of genuine novelty which "disrupts the pre-existing order of things" (Simandan, 2006: 67). An example would be a policy change, an innovation, or a

[22] This discussion utilizes scale in two ways: as an explanatory variable and as a category of practice (see Moore, 2008). In terms of the former I use scale to explain the context and the drivers that shaped ethanol policy, while in the latter I examine how scales and scaled truths were used in the decision-making and policy-making process. As a consequence, scale becomes an object of inquiry.

volcanic eruption. All rhythms and legacies were at one point events, but not all events become rhythms. For example, a political election is an event that may not regulate a space, given that another election will inevitably occur. As such, a particular election can be characterized as an event, but regular elections generally speaking are best characterized collectively as a rhythm (creating a democratic space).

Recursive cartographies, as I am applying the theory, categorizes everything as either a legacy, a rhythm or an event. This can be used to effectively describe and categorize powerful processes that are not always site specific (this is the point that theories rooted in 'flat ontology' fail to articulate effectively). Scale allows us to situate a spatial assemblage (i.e., a legacy or a rhythm) and that which disrupts an assemblage (i.e., an event). By drawing on scale as a pragmatic categorization of these operations, we can analytically collapse the context (i.e., seemingly outside legacies, rhythms and events) into the unit of analysis (e.g., Ontario) (Simandan, 2005: 57).[23] But it is important to recognize that such operations are not bounded by the scales at which we observe and interpret them as operating. Causality is not unidirectional, and our epistemological categories are not mutually exclusive or collectively exhaustive. As such, it is best to understand scale, such as the 'global' or 'regional', as a verb (i.e., a state of becoming) rather than a noun (i.e., a 'thing' to be analyzed). This theoretical framework is applicable to policy-making. Though policy is created inside of, and is legislatively bound by, its political borders, it is not isolated from socio-spatial relationships or physical realities from other non-site specific spaces. In Table 4.1, legacies, rhythms and

[23] Though I draw upon scale to explain ethanol policy in Ontario, it is important to note that I understand the dangers of reifying scale as a 'thing out there' with power and agency. I reconcile this in two ways. First, I elaborate on how scale is also a category of practice in my next section. Second, I argue that while I am committing epistemic violence by reifying a category that has no ontology in and of itself, it is a necessary abstraction to effectively explain ethanol policy in Ontario and the drivers behind it.

events are tabled against the scale at which they operate. In my discussion chapter to follow, I will fill this table in to describe the scalar constraints that I argue led to ethanol policy in Ontario.

Table 4.1 This will be completed in my discussion chapter.

Epistemological	***Ontological: The contextual framework***		
Scale	**Legacies**	**Rhythms**	**Events**
Global			
International			
National			
Regional			
Local			

'Recursive cartographies' is fundamentally based on relational thinking. The term 'recursive' is used to emphasize the iterative *co-production* of legacies, rhythms and events. By taking seriously the effects of legacies and rhythms, it does not relegate the past to obsolescence. It also implies that cartographic models of the world, while based on concrete realities, require reflection (this is also implied by cartograph***ies***, in the plural). The model is both iterative and based on one's perspective and is thus a representation of reality, not reality itself. Indeed, given my bounded rationality as a researcher, my model could never be anything but suggestive – as opposed to exhaustive – of the causal nexus of ethanol policy in Ontario. But the point of this theoretical framework is to suggest that to fully understand decision-making and policy-development one must draw on the explanatory power of singular events, hegemonic rhythms, and

political-economic-historical-institutional legacies with a 'topological' or 'relational' spatial logic: "we cannot assume that local happenings or geographies are ontologically separable from those 'out there'" (Amin, 2002: 386). Additionally, I do not claim that scales themselves present hidden social forces, but rather that the use of scale signifies the spatial extent of powerful associations that must be accounted for in the explanation of policy-making.

While legacies, rhythms and events are used to depict the socioeconomic, the institutional and the biophysical context in which policy is made and thus how operations at different scales are interdependent and consequential, it is also important to understand how an agenda gains political momentum through the *use* of these frames – i.e., through the performance of scale. In essence, "policy is made by real people" (President, Ontario Agri-Food Technologies). As such, to fully understand the relationship between scale and policy we must examine scale not only as a category of analysis, represented through recursive cartographies, but also as a category of practice. If spatial theory is going to seriously address the fact that scale is in part socially performed (or socially constructed or socially produced as other theories contend), which it has in recent decades and which I am attempting to do here, geographers must engage cognitive theory to explain how and why the constraints of legacies, rhythms and events are in turn performed and embodied in spatial representations of the world.

Scalar premises: scale as a category of practice

Globalization studies have identified the movement of ideas across space. Hagerstrand (1952) has conceptualized this as 'waves of innovation', whereby novel ideas are spread across the planet. Harrison (2004) calls this 'ideational mobility'.

Regardless of the terminology, the notion that ideas flow through space and are consequential to the material landscape is an accepted fact in globalization studies. I contend that the mechanism by which these innovative ideas become mobile and are consequential to place is the *scalar premise*. This is an elicitation whereby spatial arrangements and scalar frames serve as a warrant or a premise for a policy decision. Ideas can effectively alter the material landscape given that the scalar premise is a successful warrant for an argument. It is successful when there is a political need for action, and the action is justified based upon actions observed at other scalar arrangements. Scalar arrangements and (re)articulations are thus a premise upon which an action is taken (see Rangan & Kull, 2008). Scale as a thought regime can change the material landscape (Woodward *et al,* 2008), and thus scalar premises are a set of events in recursive cartography terminology with the potential to become rhythms and legacies.

The political need for action is driven by various legacies, rhythms and events that operate at various scales. These are invoked by policy-makers to bring legitimacy (or to add value, if you like) to an idea that intends to negotiate these operations. Maioni (2008) and Harrison (2003) illustrate how federalism is the vehicle by which innovations are diffused throughout the provinces via legislative overlaps, First Ministers Meetings, and other complex institutional ties. I am more interested in the fuel and the engine by which these innovations spread once scale has been elicited. My basic premise is that when there is a pressing need for action, individuals tend to emulate rather than originate ideas, given the boundedly rational character of decision-makers. Emulation is part of the 'toolkit' of bounded rationality that can save time, energy and effort. "Copying is easier than invention" (Boyd & Richerson, 2002: 284), and this is why we tend to see

policy emulation, specifically in terms of environmental policy, when the situation to be managed is complex and uncertain. Policy makers employ the 'do-what-the-majority-do' heuristic: if you see the majority of your peers display a given behaviour, engage in the same behaviour (Gigerenzer, 2004: 73). This is understood as rational when both observer and demonstrator of the behaviour are exposed to similar environments that are noisy, or when there is a high degree of uncertainty.

Regional policy-developments embody legacies, rhythms and events, which include scalar premises made by decision-makers and stakeholders to set the justification for the policy and to choose among competing policy agendas. However, it is important to recognize that scale can only partly explain why a particular decision (in this case, the decision to regulate ethanol in transportation fuel) was chosen. The following section will compliment a scalar conceptualization of policy-making with a discussion of networks, to understand the contingent ways space is 'acted upon' (Murdoch, 1998; Amin, 2002) by networkings.

Policy as a networked process

While more ambitious conceptualizations of networks understand them as a form of governance that replace hierarchies, a narrower focus understands networks as merely contributing to policy (Marsh & Martin, 2000; Lane & Morrison, 2006). It is this narrower focus that I have adopted, to be theorized here and to be extended in the next section on deliberative democracy.[24] I intend to demonstrate that a theory of network is required to fully understand the intricacies of policy-making. The way that legacies, rhythms and events are theorized above is not to suggest that the 'context' is a stage upon

[24] This disclaimer is important, because I do not assume that this work satisfies Latour's strict qualifications for what "counts" as ANT (see Latour, 2005). I do wish to suggest, rather, that ANT and its terminology are very useful in terms of effectively explaining policy development.

which policy-makers act, but to characterize and categorize the operations that mobilize, and become a part of, the circulation of actor-networks and their heterogeneous associations. It is the intercession of these (socioeconomic, political-economic and biophysical) operations that releases potential energies of various actors and agents as they begin to engage one another.[25] The study of the interaction and circulation of various actors can help us understand why a *particular* idea was chosen as opposed to any other policy idea. Actor-network theory (ANT) is important and useful here: it allows us to theorize about and examine the ways in which a seemingly inevitable and essential policy is, alternatively, the result of contingencies and of the performances inherent in actor-networks.

A network involves all actors and agents that successfully enrol and represent other actors and agents; in so doing, they give and receive power and *become* a set of associations that materialize as networks (Castree & Macmillan, 2001). Each actor and each agent is powerless until it enters into a relationship, and only then does it acquire attributes that define it. As such, e*ngagement* between entities is critical (Routledge, 2009): indeed, a network is where otherwise distant entities can enter into a relationship (Brown & Capdevila, 1999), which helps to partly override the 'tyranny of distance'.

The most important insight of ANT for the purpose of understanding policy-making is that the agency of things does not come from within but from the connections and the heterogeneous relations it enters into (Law, 1999). It thus takes seriously the radical indeterminacy of policy ideas. A given policy idea (e.g., regulation, taxation, etc.) and the target of policy (e.g., transportation fuel) has a 'functional blankness' upon which

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[25] I distinguish between actors and agents as Callon (1999) does: an actor is a power that enrols and dominates, while an agent has affect but lacks initiative or intention.

various actors perform, and are in turn performed (Brown & Capdevila, 1999). And it is this performance – or acting upon blankness – that mobilizes a policy idea. This performance takes on an oscillation from multiplicity to singularity (Dugdale, 1999), as the blankness is 'filled in' with the multiple meanings and multiple realities.[26] We can thus understand the form a policy idea takes by examining its relationships with legacies, rhythms, and events (including ideas, technologies and other entities).

Routledge (2009) and Nicholls (2009) argue that ANT has under-theorized how and why associations are generated. I contend that networks occur when 'ties' assemble collectives, or when mediators actively construct relationships. The extension of networks occurs through this construction. Most importantly to understanding policy-making, a tie is formed when a policy idea is economically viable: economic viability (i.e., money) – or at least the *belief* in economic viability – then, is a significant mediator in a policy-network, particularly one associated with a market-oriented regulation (such as regulating ethanol). (Re)Commodification is the tie that binds and expands both the commodity circuit (see Prudham, 2009) and the policy-network: it has the effect of aligning economic interests by expanding the functionality of given commodities, which serve as intermediaries that assemble those who are sure to prosper (i.e., it offers a will-to-connect). In addition to economic viability, scalar premises serve as ties as scales are invoked to set a specific context, to discursively frame the policy window, and to connect distant allies. This stretches the network by connecting otherwise distant entities. Lastly, relationships are heavily mediated by science, in that without the legitimacy of objective 'truth' or expert opinion, certain relationships would fall apart. As interests are aligned, and as scales and science are invoked, the network coordinates in spaces of engagement,

[26] This is why a theory of consensus-building, or in the case below of deliberative democracy, is important.

where solutions are tied to the policy problem. From there, the network is canalized to the executive where the network is constituted as a single body (hence the term actor-network: Dugdale, 1999).[27]

4.2 Deliberative Democracy

McArthur (2007) argues that provinces tend to utilize networked policy processes, which include shared and collaborative decision-making (see also Chilvers, 2009). Decision-makers find it impossible to achieve stable policy in the absence of substantive engagement with key interest groups. Additionally, government officials tap into the policy relevant knowledge prevalent among NGOs, and have begun to use electronic consultation to allow the process to run more efficiently (though they continue to have a small impact on policy outcomes; Howlett & Lindquist, 2007). Engaging key interest groups and tapping into different epistemic communities are processes that contribute to dense policy-networks, which is why deliberative democratic theory should not be ignored when discussing policy networks, especially given the recent shift from government to governance and the incorporation of multiple stakeholders that attempt to link government to civil society (Fairhead & Leach, 2003; Holzinger & Knill, 2005; Lane & Morrison, 2006).

Deliberative democracy is based on the notion that decisions oriented to the public good are best achieved through deliberation over policy issues in which "differing voices, rationalities and positions form part of the decision making process" (G. Smith, 2000: 159). It is the process by which a decision is arrived at even in the face of disagreement (Thompson, 2008), by seeking to "infuse policy processes with

[27] It is important to note that I describe this process as a logical 'A-B-C' process only for the sake of clarity. In reality, it is a circulation with far more complex temporal characteristics.

communicative exchanges oriented towards a justificatory agreement among a wide diversity of potentially affected persons" (Johnson, 2008: 4). It differs from participatory democracy in the sense that not *every* citizen is involved in the process; only active participants, or stakeholders. It also distinguishes itself from, and / or supplements, other forms of rational decision-making: those that are technocratic or based on a top-down structure of control. These latter approaches to decision-making are arguably inefficient in the realm of environmental policy-making where the uncertainty and complexity of the natural environment, and the bounded rationality of decision-makers, are obstacles that must be overcome in the decision-making process. Given this, deliberative forms of consultation have been favoured in the environmental policy-making process (Smith, 2003; Chilvers, 2009).

Deliberative democracy is closely related to Habermas' theory of communicative action, though the former is a practical way to make "robust choices about the future in a real world situation" while the latter is merely an ideal (Innes, 2004: 9). Nevertheless, Habermas (1971 & 1981) asserts that in addition to scientific knowledge, interaction and mutual understanding – i.e., *co-constituted* knowledge – must be privileged in the decision-making process to assist with ethical matters and inherent uncertainty. Participants seek understanding through cooperation rather than through conflict, which imparts power and influence on the process itself (Slocombe & Hanna, 2007). Incorporating and integrating voices and values will lead to social learning and can thus cope with uncertainty and the need to incorporate a broader array of values (Parkins, 2006; Dovers & Price, 2007). Indeed, deliberative democracy is a means, not an end, to achieving rationality in collective decision-making. However, to take a lesson from ANT

theorizations of consensus-building, it is useful to understand that negotiation oscillates between multiplicity and singularity, rather than multiplicity to some 'resting point' where interests have converged (Dugdale, 1999). Interests and realities remain multiple, and in this way ties remain heterogeneous and thus the deliberative outcome (or product) has multiple connections, thus contributing to its stability.

There are three moments of the deliberative process: its organization, its practice and its product (Ryfe, 2005). The form of deliberation is consequential for its outcome, and as such "decision-making procedures should not be concerned only with aggregating preferences, but also with the nature of the processes through which they are *formed*" (Smith, 2003: 55, emphasis original). Innes (1996 & 2004) argues that a decision is communicatively rational to the extent that it is reached consensually through deliberations involving all stakeholders, where all are equally empowered and fully informed. Communicatively rational decisions, then, are those that materialize through consensus and justification rather than through the political or economic will of particular stakeholders (Innes, 1996: 461). However, the effectiveness of the communicatively rational decision to reflect the real problem is dependent on the deliberative organization and the spaces available for engagement and coordination. As such, it is more appropriate to focus on the *deliberative* rationality of a decision – i.e., how the decision adapted to the deliberative organization and structures (see Smith, 2003) – rather than on the communicatively rational nature of the decision: the former can help us understand the disjuncture between a decision and the problem while at the same time offer an analytical framework to determine the justness of the policy process.[28] A deliberatively

[28] Dryzek (1990: 202) defines deliberative rationality as "egalitarian, uncoerced, competent, and free from delusion, deception, power and strategy".

democratic decision is rationally aligned with the solution to a given problem, but its alignment is dependent on the actors who frame the problem and the solution. As such, by analyzing the variation among the actors who constitute the deliberative group and the ways in which they utilized spaces of engagement, we can begin to analyze in what ways the problems and solutions are being framed and how well the decision is adapted to a full range of values.

Given that structural reform can dictate who is heard and who is silenced in the policy-making process (Sharp & Richardson, 2001), any application of deliberative democratic theory in Ontario must take into account the nature of Canada's political system. "The possibility of realizing a deliberative democracy depends partly on linking deliberation to the political system" (Ryfe, 2005: 60), and to the production of winners and losers which are not always recognized but are always produced (O'Brien & Leichenko, 2003). Canada's political structure bodes well for the inclusion of stakeholders and interest groups. There are multiple points of access at multiple levels of government in which voices can be heard (Holland 1996).[29] However, the political system is executive-dominated, and thus cabinet agencies are powerful in the decision making process (Hoberg, 2002; Harrison, 2002; Bakvis & Skogstad, 2008), which may undermine the power of other actors such as NGOs, elected officials, industry and so forth. In spite of this alleged shift to executive federalism in Canada, both decision-makers and policy-makers usually engage stakeholders who will be affected by the decision (Pickvance, 2000). The criteria for involvement in the decision is an important

[29] These multiple points of access are what I mean by 'spaces of engagement'. I will discuss them further in the following chapter.

factor that contributes to the organization of the deliberative process (Ryfe, 2005), and thus of its outcome.

A significant dimension of deliberative democracy concerns the nature of incentives. There is "no getting around the fundamental structure of incentives" in a liberal democratic society (Simeon & Nugent, 2008: 97). Incentives are essentially any item that provides a motive to act or decide in a particular manner, which may or may not be conducive to, or commensurate with, the task at hand (i.e., sound environmental policy). The willingness of decision makers to pressure their party or their government to implement environmental policy, or to involve themselves in deliberation, can be understood partly as a result of incentives (Olsen, 2008). These have the potential to influence the ideals of deliberative democracy, and to influence how truth speaks to power. Sowell (2002 & 2004) identifies one as re-election: "the prime problem of politicians [or a political party] is not to serve the public good but to get elected to office and remain in power" (2002: 168). This can dictate how a decision-maker incorporates the concerns of various stakeholders, including NGOs or the scientific literature. Another incentive is the perceived need for urgent decisions. The severity of the situation (e.g., 'fast' global warming) has the tendency to cause a divergence from democratic decision making for the purpose of "making something happen now" (McLaughlin, 1993: 10). Public demand, or the framing of the issue at hand, has the power to 'trap' policy makers into making decisions 'for the environment'. This is particularly true in Canada, where the Ministries are intimately connected to the desires of the citizenry (McCarthy, 2006), and where 'flip-flopping' on policy issues is strongly discouraged. Accountability (or lack thereof) is an incentive that links together public demand and the urgency of a

problem. But, ultimately, the incentive most often recognized by deliberative democratic theorists is the need for legitimacy and justification (Johnson, 2008; Smith, 2003). In a democratic political system, the basic incentives of public demand, urgency and accountability (but not the form they take) can be understood as *a priori* to any environmental political decision, and greatly affect the deliberative organization of a given policy issue and the degree of foresight that goes into the decision.

4.3 Uncertainty

Most problems of any importance, particularly ecological problems, are invariably complex, even by computational standards (Ludwig *et al*, 2001; Gigerenzer, 2004). As such, uncertainty, rationality and political realities are crucial to theorizing about the relationship between science and policy, between truth and policy, and between policy intentions and real policy outputs. Given the limited knowledge of policy-makers and the complexity of the socio-natural realm policy attempts to manage, I contend that uncertainty is a central characteristic of policy (Hammond, 1996).

While I do not explicitly identify my work with the genre of political ecology, I do think there are many notable parallels. Chief among them is the attempt to understand the relationship between ecological phenomena and political recourse, and to describe how politics, inequality and market decisions are reflected in the material landscape.[30] Given this, the insights developed in this section have relevance for studies in political ecology. In its cognitively-oriented focus, this theoretical approach can help extend political ecology beyond its post-colonial and neo-Marxist roots where the principal target is 'hubris' toward the environment (Dobson, 2003: 70) and where economic

[30] Political ecology revolves around the concepts of marginality, pressure of production on resources and plurality to explain ecological change (Paulson *et. al*, 2003), while making the ecological political (Rangan & Kull, 2008).

reductionism, or the favouring of the global market economy and thus the global scale, is paramount. In addition to this, the following can be read as a theory that does not uncritically conflate knowledge with power to the extent that 'might makes right' (see Lifkin, 1994: Chapter 2). I am not implying that knowledge and power can be disentangled ontologically or empirically. Rather, I intend to broaden the 'political' to understand political choices as not only an effect of power relations and market forces, but also of uncertainty and of the boundedly rational nature of decision makers. By doing this, I recognize the fact that knowledge and power can be separated conceptually.

Policy does not merely draw upon the 'technologies of rationalization' (i.e., models, data, and decision-rules: March, 2006). Rather, policy is "a much more complex set of inter-relationships between means and ends, between formulation and implementation, than suggested by the rationalized model" (Rydin, 2005: 76). All things considered, policy can be defined as the extension of boundedly rational insights into a management scheme, and is thus an action 'deduced' from both value premises and factual premises in the context of significant uncertainty (Simon, 1996).

Uncertainty in ecological knowledge causes difficulties when this knowledge is used for regulatory purposes, particularly when action needs to be taken before the full story is known (Ludwig *et al,* 2001).[31] Uncertainty is ubiquitous to problems that are "intractable by traditional scientific methods" (Ludwig *et. al*, 2001: 484). It is also ubiquitous to policy-making, given that all human agents – and thus all decision-makers and policy-makers – are boundedly rational (I urge the reader to refer back to section 3.5 for a discussion on how bounded rationality challenges typical (economical)

[31] That action needs to be taken is a point one should not take lightly; at some point, a decision-maker needs to make a decision that (s)he believes will produce the best possible outcome. I will elaborate on this soon.

understandings of rationality). Hammond (1996) argues that the most appropriate way to manage uncertainty is to recognize and utilize a continuum of knowledge between intuition and analysis.[32] Problems of great complexity will require both, particularly in light of the fact that decision-makers and policy-makers cannot take years to perfect their knowledge before making a decision. To simplify the decision, policy-makers employ tactics that can, among other things, reduce the need to gather information, narrow the range of possible alternative and outcomes, and will sequentially determine how alternatives 'stack up' against one another. These strategies are highly consequential for the specifics of the policy, and as the reader will soon discover, space and spatial imaginaries are directly implicated in this.

[32] Another stategy to manage uncertainty is to utilize a deliberative democratic framework to inform policy when conducting policy analyses (Johnson, 2008). I will speak more about this in the next section.

Chapter 5 – Discussion: seeing the trees

This chapter will organize the discussion of the findings of the empirical research in five parts. First, a brief chronology of Canadian and Ontarian ethanol policy is given. Second, the context in which Ontario's decision to regulate ethanol in transportation fuel was made is reconstructed by triangulating interviews, documents and a statistical analysis of corn prices to figure out the original 'decision environment' and determine how scalar forces constrained and enabled decision-makers and policy-makers. Third, the organization of the policy network is analyzed. This compliments the analysis of the decision environment and the drivers behind the policy by bringing out the role of NGOs, of the scientific community and of the provincial ministries that were involved. It also illustrates the relationship between net-workings, commodification, scalar premises and science. Last, the ways in which uncertainty has shaped the specifics of ethanol policy in Ontario is examined.

5.1 A brief chronology: ethanol policy in Canada and Ontario

The most common bio-fuel in Canada is grain-ethanol, a fuel derived from the starches of common grains (i.e., wheat, barley, corn). In 1992, the federal government first invested in ethanol production by removing the $0.10 excise tax / litre on gasoline that was blended with ethanol. In 1997, the *Alternative Fuels Act* (AFA) required an alternative fuel blend in the vehicle fleet of Crown corporations, which generated a small but 'elite' market for ethanol blends in Canada. Federal investments intensified with the *Ethanol Expansion Program* (EEP) in 2003, which subsidizes the construction of ethanol production facilities. Prime Minister Stephen Harper announced the *ecoENERGY for Biofuels Initiative* (EBI) in 2007, allocating $1.5 billion over nine years to support bio-

fuel production in Canada. The EBI came on the heels of the *Biofuels Opportunities for Producers Initiative* (BOPI) which directs funds to rural communities to develop feasibility plans for the purpose of generating a consistent and 'Canadian' feedstock. As this thesis is being written, *Bill C-33 – an Act to Amend the Environmental Protection Act,* is being granted Royal Assent and will come into force at a date to be determined by the Governor in Council. This bill will institutionalize recent bi-partisan campaign promises to regulate renewable energy sources, and will do so primarily with grain-based ethanol.

Ontario, particularly the south-west, has established itself as an epicentre of Canadian ethanol production. *Commercial Alcohols,* now *Greenfield Ethanol*, began turning corn into fuel in the Chatham-Kent area in 1993 and has since become the largest ethanol producer in Canada. In 1998, Jim Carroll (MPP for the Chatham-Kent riding), introduced *Bill C-34 – A Bill to Amend the Environmental Protection Act.* This was an attempt to mandate oxygen content – 2.7 per cent by weight – in all transportation fuel sold in Ontario. The main oxygenate, as per legislative discussions, was to be ethanol derived from corn feed-stocks. With this bill, one can see the beginnings of a diverse policy-network; enrolling state actors, the energy community and the agricultural community. Bill C-34 survived to its third reading, but an analysis of the legislative proceedings via Hansard and the results of the provincial election on 3 June 1999 indicate that it was a casualty of political change. The dream to produce fuel from agricultural feed-stocks in Ontario would not end there, however.

In November 2004 the Liberal Government of Ontario committed to a 'renewable fuel standard' which mandated, on average, a minimum of five per cent ethanol by

volume in all gasoline sold in Ontario. This commitment was institutionalized by the *Ethanol in Gasoline Regulation* (EGR) as part of Ontario's *Environmental Protection Act* (EPA) in 2005, and was officially enforced 1 January 2007. With this, Ontario joined Manitoba and Saskatchewan as provinces that passed ethanol legislation ahead of any national standard. The EGR is financially supported – in conjunction with the federal investments mentioned above – by the *Ontario Ethanol Growth Fund* (OEGF), which carries a budget of $520 million over 12 years. This funding is to be used for ethanol industry subsidies and the reduction of market barriers for Ontario ethanol producers. I encourage the reader to refer to appendices A and B, respectively, for a detailed timeline of the seminal events and decisions regarding ethanol production in Canada and Ontario that have been discussed here. The following is a discussion based around the EGR and the OEGF: Ontario's seminal ethanol regulatory strategies / authorities.

5.2 The context of Ontario's ethanol policy: scale as a category of analysis

As mentioned in the previous chapter, space can be seen as constituted by the interplay of legacies, rhythms and events (Simandan, 2005 & 2006). These concepts can be used to examine and understand the political-economic, the socioeconomic and the biophysical context of ethanol policy in Ontario. These contexts are separated for analytic purposes only: the point of 'recursive cartographies' is to acknowledge the fact that they are actually co-constitutive. Scale is the concept used to represent the spatiality of this context: it characterizes spatially the powerful influences of non-site specific phenomena without necessarily fixing them to a given spatial dimension or understanding them as *a priori*, while at the same time addressing the fact that a policy, its context and

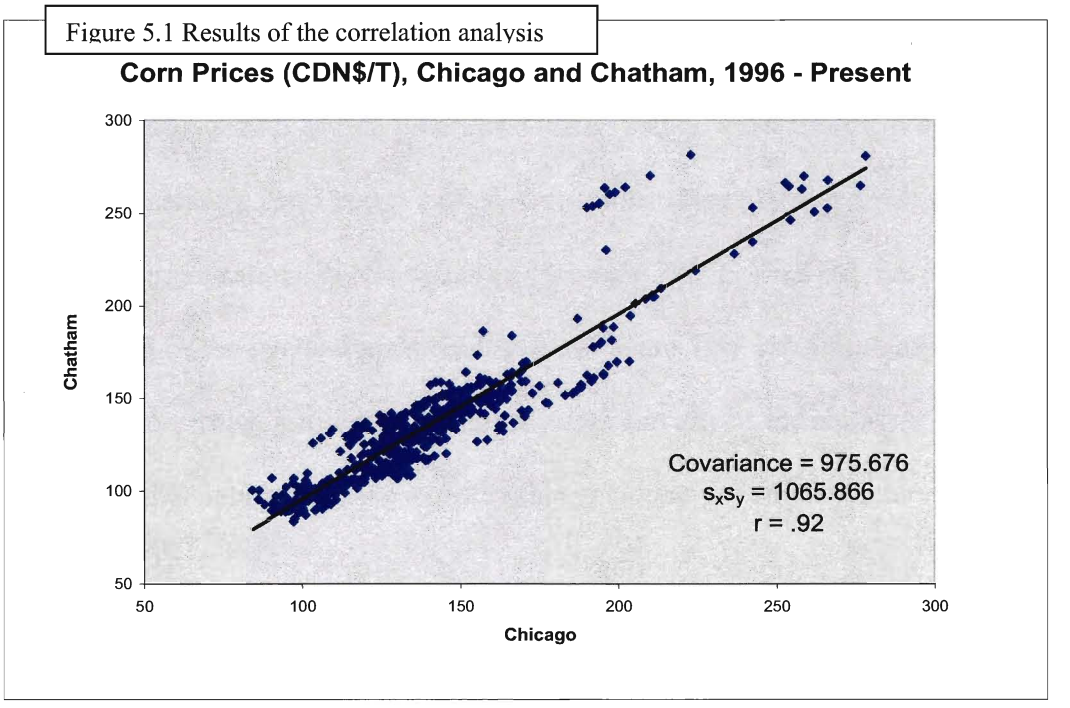
its truths are implicated in a 'constitutive hierarchy' that ranges from the global to the level of the (politicized) body (see Sayre, 2009).

The political-economic context: international operations

The provisions of treaties such as NAFTA – and the complex interdependence they promote – pose challenges to the independence and autonomy of national and sub-national jurisdictions, and in many ways narrows the ambit of policy choices (Conca, 2000; McCarthy, 2002 & 2005; Skogstad, 2008). Given that the Government of Canada negotiates the terms of international trade and commerce and international treaties, this policy must be analyzed in the context of Canada's international commitments. The purpose of this sub-section is to analyze the ways in which international political and economic integration constrained ethanol policy in Ontario, and thus how a regional policy is a piece of larger economic and political adjustments.

The results of Pearson's product moment correlation test (see Figure 5.1 below), indicate that there is a strong positive linear correlation between the price of corn in

Figure 5.1 Results of the correlation analysis



Chicago, and the price of corn in Chatham [$r(631) = 0.92$, $\alpha < 0.05$, one tailed]. But it is important to note that correlation does not imply causation. The causal relationship is certainly not between the prices themselves. However, judging by the strong correlation between the two, we can infer that what *is* causing prices to change in one country is having an effect on the other: there appears to be a common-cause relationship. This inference is supported by the results of Student's t test, where $t_{calc}\ (1266) = 4.099^{-17}$, $\alpha <$ .005, two tailed, fell within the critical range ($t < 1.65$), meaning that the null hypothesis is accepted: any difference in the means is due entirely to chance. The conclusion of these initial findings, then, is that the price of corn in Chicago and Chatham is significantly correlated in both relative and absolute terms.

The 2002 'Farm Bill' was an event (in 'recursive cartography' terminology) that disrupted agricultural trade in North America.[33] It was the first revision made to statutory federal agricultural assistance in the U.S. since 1996. This Farm Bill granted three incentives to American corn producers: (1) direct payments up to $0.28/bushel, (2) countercyclical payments, offering protection from falling prices and (3) substantial marketing loans (National Agricultural Law Center, 2008). Furthermore, it offered an export credit guarantee that Canada and other countries claimed was a direct violation of World Trade Organization (WTO) sanctions (Schnepf, 2007). This bill was part of a trend identified by the international community for years: U.S. subsidization of its corn-producing sector, which artificially decreases prices and affects the ability of corn-producers in other nations to make a profit without similar government intervention.

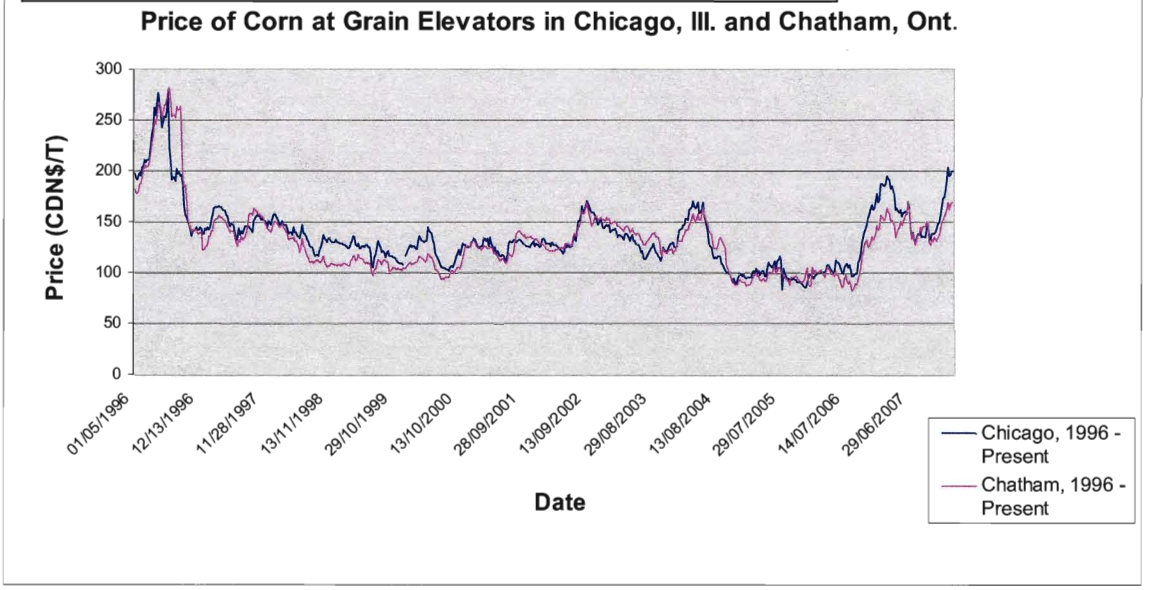
[33] A Farm Bill replaces previous federal farm Acts with respect to federal support, conservation, marketing and aid (Becker & Womach, 2002).

To determine the effects of the 2002 farm bill on corn prices, I analyzed the change to price after 2002 using the Mann-Whitney *U* test. The null hypothesis states that there is no difference in the means of the samples. I employed a *z* score to test for significance, which was determined after the *U* values at each location for T_1 (1996 – 2002) were attained. The *z* score for Chicago and Chatham was -6.15 and -5.00, respectively. With reference to Appendix 1C in Hammond & McCallugh (1974), the probability of a value associated with each of these values is 0.000. The null hypothesis can therefore be rejected with the highest degree of certainty: the means from T_1 and T_2 were significantly different, which suggests that the price of corn after 2002 dropped. Again, it would be impossible to determine statistically a causal relationship between these results and the Farm Bill of 2002. There are certainly other factors that affect corn prices: changing input costs, the price of oil and fluctuations to the supply / demand relationship to name a few. However, the fact that corn prices dropped drastically after the bill took full effect – see the quote and Figure 5.2 below – appears to be a key element in the relationship and in the examination of ethanol policy in Ontario.[34]

> "***The US is the price leader for corn with 61% of world exports generally sold at prices below estimated production costs.*** Deep pocket ***US farm subsidies have stimulated over-production and driven down prices*** on world markets to the extent that ***Canadian corn farmers now face an income crisis,*** falling prices and an inability to recover even their cash costs of production … The ***2002 Farm Bill exacerbated the problem***"
> - Canadian Corn Producers, 2005a: presentation to the House of Commons

[34] Note that the emphasis placed in all of the quotes used is my own, unless otherwise specified. I use emphasis to tease out the most significant aspects of the quotes to paint a clearer picture.

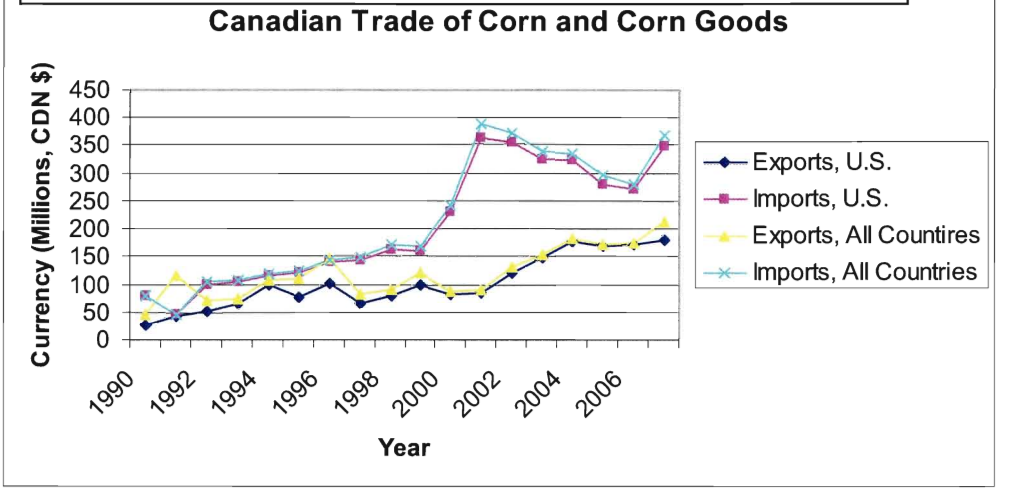
Figure 5.2 Time series of the price corn. Data acquired through AAFC.



This time-series graph illustrates that corn prices in Chatham react to the price of corn in Chicago. This is evidence of not only the interdependence of corn prices among the two locations, but the sensitivity of Canadian corn prices to those set in the U.S. which are – as my discussion above suggests – artificially suppressed as a consequence of government intervention. These findings are consistent with those of Vyn & Marchand (2005) who prepared an OCPA-funded report on the importance of Ontario's corn sector. They argue that government intervention in the U.S. not only made corn imports more attractive, but encouraged over-production which deflates prices.[35] If we examine the changes in price in conjunction with the changes to the balance of trade illustrated below in Figure 5.3, it seems obvious that the OCPA and the CCPA had valid arguments: American producers were favoured in the marketplace, which negatively affected corn producers in Ontario (see Canadian Corn Producers, 2005; Schnepf, 2006 & 2007).

[35] This argument is not unlike arguments made by renowned liberal economists many years earlier: that farm purchasing programs and social assistance of the like do not so much increase farmers' income as encourage over-production, which distorts an otherwise 'healthy' market (see Friedman, 1962: 182).

Figure 5.3 Canada's corn-related trade balance. Data acquired from AAFC.



As the quote below illustrates, the constraints imposed by international regulations and international treaties were part of the 'decision environment', subsequently shaping the decisions and actions of decision-makers in Ontario.

> "[Ontario's corn] price is set by what happens in the U.S. [Ethanol policy] was a price fix for corn farmers who were screaming they were getting screwed. It was also a good use of government money. ***We couldn't take on the U.S. treasury, so [regulating ethanol] was a solution.***"
> - President, Ontario Agri-Food Technologies

This suggests that Ontario's corn industry and ethanol policy are at least partly shaped by international economic adjustments. That Ontario's corn price is "set" by what happens in the U.S. indicates that the causal arrow is as my statistical analysis suggests – from Chicago to Chatham – and that the cause-effect relationship is exacerbated by trade agreements and government interventions at national scales. The decision to regulate ethanol in Ontario seems to have partly been the result of an "if you can't beat 'em, join 'em" attitude – a consequence of constraints imposed by international political-economic integration. These constraints, proponents of the ethanol industry argued, would be nullified with an expanded ethanol industry:

> "All I [Jim Johnson, Alviston corn producer and president of the CRFA in the late 1990s] want is a price. I don't care if [ethanol producers] buy my corn or not. ***All I want them to do is help me improve my price.***"
> - taken from Tobin and Button, 1997

In addition to driving a decision, treaties operating at larger scales – such as NAFTA and the WTO – shaped the actual policy in as much as it narrowed the significance of Ontario's regional interests.

> "***We cannot mandate the use of Ontario corn because it is a globally traded commodity, and we cannot force [ethanol] producers to sell their product domestically because of NAFTA***".
> - Senior Financial and Policy Analyst, OMAFRA

> "If ethanol producers were forced to buy Ontario corn, ***red flags would have been raised*** by NAFTA"
> - former Minister, OMAFRA.

There is a clear power relationship from operations at the global scale (global trade rules) and the international scale (price interdependence and treaties) to operations at the regional scale (economic and policy adjustments: i.e., ethanol regulation). These not only effectively reconfigured the material landscape at the regional and local scale through less land seeded to corn and the negative impacts this has had on Ontario's rural economy (the problem) and more ethanol bio-refineries being constructed (the solution)[36], but they have also influenced the way the policy took shape.

Aside from perturbations to the corn market, the state of the environment – which will be discussed soon in ecological terms – has been a salient issue at all scales. Of significance to the context of ethanol policy in Ontario is Canada's commitment to the Kyoto Protocol, its most recent revision being in 2002. The Kyoto Protocol is an institutionalized global commitment to reduce GHG emissions, which linked accountability from the local scale through to the global scale. This new reality was not ignored by ethanol policy makers:

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[36] See appendix C.

> "Through these GHG reductions, Regulation 535/05 will help Canada meet its obligations ***under the Kyoto Protocol.***"
> - Backgrounder, Ethanol in Gasoline Regulation, Ontario Ministry of the Environment

I have emphasized the term 'under' because it nicely suggests that the global scale has shaped actions at the national scale in the form of commitments to the Kyoto Protocol – exemplified by annual "Climate Change Plans" for Canada – which have subsequently shaped actions at the regional scale in as much as ethanol policy is in spirit with these plans. As a consequence, global warming and the Kyoto Protocol – as operations that seem to be operating at other scales – partly drove the decision to produce ethanol in Ontario.

The socioeconomic context: local economic priorities

> "This [policy] can't be taken out of the context of ***what our corn producers were experiencing at the time***."
> - Senior Financial and Policy Analyst, OMAFRA

Ontario's corn industry is sensitive to agricultural policy in the United States due to the ease with which their goods can cross borders, and vulnerable due to their relatively weak market clout.[37] This relationship can have serious effects locally; especially given that the corn industry directly and indirectly employs between 15 000 and 28 000 people in Ontario (Vyn & Marchand, 2005: Tables 1, 2 and 3). At the turn of the century, Ontario corn-producers attempted to force legal action against the "dumping" of cheap corn by the United States onto Canadian markets (Canadian Corn Producers, 2005; Schnepf, 2006 & 2007). Ontario corn producers were arguing extensively that, due to the

[37] The United States is a world leader in corn production, averaging 325 million tones of corn grain per year, while Canada produces 9.5 million tones (Agriculture and Agri-Foods Canada, 2007). Slightly less than 60 per cent of this is grown in Ontario every year (Statistics Canada, 2006). I have used the term 'vulnerable' to denote the fact that rural regions in Ontario are impacted – in this case negatively – by what happens in the U.S. (see Keohane & Nye, 2001 and the discussion above). Indeed, the commodities sector is heavily influenced by where the 'market power' lies. In a recent article in the Welland Tribune that featured a research director from the National Farmer's Union, he stated clearly that "***we need to look at the real problem, which is market power***" (Mayer, 2008: A8).

ability of American farmers to sell corn at a price below its production costs and the over-production that the farm bill encouraged, producers in Ontario were unable to generate a fair return on their crop (see OCPA Editorial, 2007). Given that corn production is a major industry in Ontario and a staple for rural economies – particularly in the southwest – rural regions were suffering from a suppressed corn price and fewer market opportunities. In addition to this, the OCPA and Ontario Cattlemen's Association were at odds over an equitable solution. Low corn prices were making Ontario cattle very competitive internationally, and the OCPA's suggestion to impose a tariff on imported grain from the U.S. would have affected the cattle industry (Ontario Cattlemen's Association, 2006). This conflict between two major rural industries made for a complex situation.

Statistics Canada notes that almost 5000 fewer farms were growing corn in 2006 than in 2001 in Ontario, which resulted in a reduction of nearly 500 000 acres of land seeded for corn (see Figure 5.4 below). Rural Ontario was planting less corn, and corn producers were visibly concerned. In effect, the socioeconomic situation in rural Ontario was emerging into a salient policy issue in the late 20th and early 21st centuries – highlighted by Ontario's Rural Job Strategy Fund in 1997 (see Tobin, 1997). The quote below suggests that major players in the southwest recognized that ethanol could alleviate some of these concerns (see also Klein, 2005):

> "[Economist for, and then manager of, the OCPA Brian] Doidge predicts the Chatham ***ethanol plant will boost corn prices in the southwest*** by an average 10 cents a bushel …"
> - taken from Tobin and Button, 1997

> "***One means of enhancing price for commodity corn is to expand domestic industrial corn processing rather than exporting bulk grain***. The idea is to increase demand as close to home as possible for as much corn as possible. ***To facilitate that expansion in domestic industrial demand,*** policies and initiatives that foster a business climate in Ontario where investors want to invest in corn processing, need to be pursued at all levels of government."
> - taken from OCPA editorial, 2005

"[Ethanol is] made from agricultural crops, so ***this will be a major boost for rural communities. And it's great news for ethanol producers, who can now move forward on new investments and jobs***…"

- Premier McGuinty quoted by Ontario, Office of the Premier, November 26, 2004

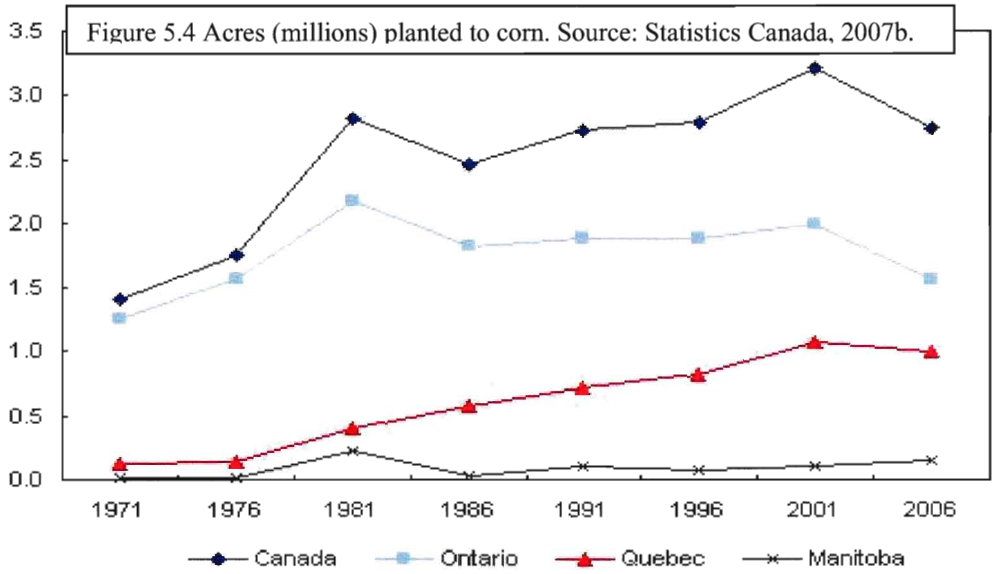

Figure 5.4 Acres (millions) planted to corn. Source: Statistics Canada, 2007b.

The maps in appendices E and F offer further insight into the socioeconomic status of Ontario's major corn-producing region. What is most noticeable are the numbers out of Chatham-Kent County. That less corn was being planted was only one issue. Of greater concern was the spatial disparity in unemployment rates and incidence of families with low income that was plaguing Chatham-Kent.[38] In addition to this, Canada's own 'rustbelt' was beginning to develop in the Windsor-Chatham corridor given the number of plant closures and lost manufacturing jobs. This added to the financial woes that south-western Ontario was experiencing, and surely helps explain why all of the campaign platforms for the leading parties in the 2003 provincial election in Ontario committed to forms of development and environmental policy that

[38] These maps were generated using statistics from the 2001 census, and thus offer a good snapshot of the socio-economic state of corn-producing regions in Ontario in the years leading up to ethanol policy. It is also important to note that the original announcement of the policy by Premier McGuinty was made, symbolically, in Chatham (see Ontario, 2004).

incorporated these local priorities. This especially included investment in renewable sources of energy which offered new opportunities for farmers (see Table 5.1 below).

Table 5.1 Promises made in 2003 campaign. Source: Moore, 2003

Party	Promise (commitments) to rural communities
Liberal	"Improve agricultural markets, in part by demanding use of bio-diesel and ethanol in gas." "Improve safety net for farmers."
NDP	"Support production of crops for alternative fuels" "Revamp commodity-pricing system to make sure farmers get a fair price for food they grow."
PC	"Develop unused Crown lands."

The biophysical context: global climate issues

This section is based on the premise that the non-human has 'political effectivity' and thus has agency in the policy process (Castree, 2003: 209). The reports generated by the International Panel on Climate Change (IPCC) have stated more assuredly with each publication that climate change is the direct result of an altered atmospheric chemistry caused by human practices such as burning fossil fuels (see IPCC 1995, 2001 & 2007). Many argue that this is an example of the co-evolution of life and climate (Schneider & Londer, 1984; Slaymaker, 2001; Kirchner, 2002). Indeed, that organisms affect their surrounding environment is – for the most part – a generally accepted fact in the ecological community (Kirchner, 2002).[39]

What is most important about the co-evolution of humanity and climate is the rate at which climate change is occurring. Anthropogenic climate change has occurred faster

[39] Though how the environment will adjust and how such organisms will adapt continues to be the subject of great controversy.

than has ever been documented in paleo-climatic studies (Harper, 2008). That it has been recognized all over the world by multiple research teams using multiple methods is clear evidence – in this researcher's opinion – that climate change is a biospheric process. International treaties such as the Kyoto Protocol and ongoing international symposiums signal that atmospheric chemistry and global climate change are legitimate concerns for the international community. This large scale ecological and political rhythm (in 'recursive cartography' terminology) has contributed to valuing ethanol as a GHG mitigation strategy: jurisdictions all over the world are adopting bio-fuel policies (Agras CEAS Consulting, 2006). Given that approximately 27 per cent of global GHG emissions (Chapman, 2007) – and 31 per cent of Ontario's GHG emissions (personal communication, senior policy advisor, OMAFRA) – come from the transportation sector, it comes as no surprise that this sector is targeted. Much like the socioeconomic state of Ontario's rural regions, the ecological state of Earth necessitates ecologically-sensitive public policy that targets GHG emissions.

Characterizing context: a pragmatic and explanatory use of scale

In Table 5.2 below I have summarized the legacies, rhythms and events that have co-produced an environment that is ripe for changing Canadian agricultural, energy and environmental policy. Scales serve as a co-constitutive spatial categorization that allows us to make sense of and to situate – rather than 'fix' – political-economic, socio-economic and biophysical components that act as drivers in the causal nexus of public policy formation, thus creating a policy 'window' in which decision-makers and policy-makers can act. Given that operations at various scales were *directive and constitutive* of Ontario's ethanol policy, it is best to understand scales as co-constitutive hierarchies,

always in a state of becoming. We cannot resort to 'flattening' this because, for instance, it would be misleading to lump the co-evolution of humanity and climate in the same spatial frame as regional phenomena, or the corn-ethanol regulation in the same spatial frame as global phenomena. To be sure, the co-evolution of life and climate is constituted by operations at regional scales, but it is not *only* regional and has a greater spatial extent. And while corn-ethanol regulation is a consequence of this co-evolution, it is not nearly a global phenomenon, least of all because there are regions of the world that lack the necessary heat units, amounts of rainfall, or the biotechnology to grow corn.

A scalar framework also effectively conceptualizes the flow of power that is involved in setting a policy agenda: macro-level political-economic adjustments (e.g., U.S. subsidization) altered the micro-level physical and social landscape (e.g., the socio-economic situation in rural Ontario), both of which were consequential for the terms of sub-national political action. The EGR, as a mandatory blending regulation, was designed to help insulate Ontario from the forces described above. This demonstrates the 'complex interpenetration' of social and physical processes between global and local scales to illustrate the relational nature of operations at various scales (see Howitt, 1993 & 1998; Sayre, 2009). Consequently, there are *always* domestic *and* non-domestic drivers to policy (Lenschow *et al*, 2005).

Table 5.2 Legacies, rhythms and events and the scale at which they operate.

Epistemological	***Ontological: A contextual framework for ethanol policy in Ontario***		
Scale	**Legacies**	**Rhythms**	**Events**
Global	Co-evolution of life and climate Industrialization	WTO; globally traded commodities	Kyoto Protocol (revised in 2002) Farrell *et al* (2006)
International (North America)	Strong economic ties with the U.S. U.S. economic clout, particularly in terms of corn industry	NAFTA U.S. subsidization of its agricultural sector	2002 U.S. Farm Bill Drastic reduction of corn prices in Chicago and then in Chatham (circa 2003)
National (Canada)	Reliance on staples economy Political structure based on principles of federalism Constitution silent on 'environment'	Market-oriented policies Tax exemptions for renewable fuels Governments acting unilaterally on environment	Ethanol industry investments (EEP, BOPI, etc) – see Appendix A Almost annual climate change plans for Canada
Regional (Ontario)	Canadian economic 'powerhouse' or 'the engine of growth' for the Canadian economy Most transportation-sector contributions of CO_2 in Canada	Environmental legislative authorities (e.g., EPA) Increasing 'smog days' in major urban centers Struggling corn producers	2003 election and its promises to promote renewable fuel sources Ethanol industry investments – see Appendix B
Local (Rural areas)	Entrepreneurial attitudes Reliance on primary industries and volatile global commodity prices Cultivation of corn Susceptibility to trade policies and market fluctuations	Difficulty producing corn at a profit Relatively low employment rates and high incidence of low income families	Petitioning to bring the concerns of Ontario corn producers to the WTO (post-1996) Rural Job Strategy Fund, 1997 Commercial Alcohols producing ethanol, 1994

Triangulating my interview data with the statistical analysis of corn prices and an extensive documentary analysis make it clear that the context described above directed Ontario's ethanol policy. Indeed, the overall rationale for the policy seems to tie together the political-economic, socioeconomic and biophysical components that shaped this policy:

> "This was the response to ***historic low commodity prices, a way to build trust in rural communities and with farmers***, and to ensure long term rural and agricultural infrastructure."
> - President, Ontario Agri-Food Technologies

> "By supporting the production of ethanol fuel, ***we're helping our farmers, creating jobs in rural Ontario and moving forward with our plan to reduce greenhouse gases and the harmful emissions that cause smog***."
> - Premier McGuinty, quoted by the Office of the Premier, 17 June 2005

Regulating ethanol in Ontario was the result of complex negotiations of the forces that created a political need for action. Instead of continuing to offer the $0.10 tax exemption, the province simply reinstated it and used the subsequent revenues – via the OEGF – to generate investment in a provincial ethanol industry that would create jobs and wealth, adjust corn prices, and combat climate change.

All that said policy is made by real people and not by broad impersonal context. As such, a thick analysis of a policy-decision requires one to analyze the embeddedness of the decision by jumping down to the scale of the body and paying attention to the cognitive mechanisms and limitations at work in the policy-making process.[40] As part of this requirement, I shall explore the relationship between scale as a category of analysis (above) and scale as a category of practice (to follow). In doing so, I recognize along with Moore (2008) and Brown and Purcell (2005) that scale is an object of inquiry.

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[40] Neil Smith was the first to extend geographical scales below the 'local'. He theorizes the body as the lowest rung of scales: as such, the cognitive examination to follow becomes subject matter for geography.

5.3 Scale as a category of practice

I hope to illustrate two things in this part of the discussion: (1) that scales are used as a premise to justify (i.e., make an argument) for a given policy and (2) that decision-making and policy development are the function of emulation rather than origination of ideas. I am committed to bringing the analysis to the individual because I do not want to attribute ethanol production solely to market forces, powerful interests or any other broad, impersonal, systematically organized structures and processes. While it was in some sense path-dependent (as is all policy), and a product of its environment strictly speaking (indeed, this is why scalar theory is useful), it was also the outcome of negotiations and decisions made by real people. As such, I think it is an important step in policy studies to link the environment as discussed above to the strategies of decision-makers, thus bringing the analysis to the scale of the body.

Scalar premises

In order to navigate and negotiate the constraints imposed by forces at different scales, which have been laid out in Table 5.2 above, decision-makers and policy-makers elicit scale to justify and set a policy agenda: this is called a *scalar premise*. The global to local framework I have set out above does not only constrain decision-makers by limiting their choices, but they enable decisions to be made and actions to be taken by becoming a premise upon which action is taken. I find the analogy of a policy 'window' to be useful here (see Micheals *et al*, 2006; Cohn, 2007). The intercession of legacies, rhythms and events created a window of opportunity in which policy-makers acted: that window offered a way in (i.e., it offered a chance to create ethanol policy) but its frame limits the entry point (i.e., it constrained the policy agenda and its implementation). This

is to say that decision makers are free to choose, but only in the confines of their environment. Table 5.3 below illustrates how both decision-makers and policy-makers invoked the forces at different scales to justify ethanol policy in Ontario: scale thus becomes a medium through which action is enabled (see Giddens, 1982).

Table 5.3 These quotes demonstrate how scale is invoked.

Scale	Analyzing scale as a category of practice
Global	"Through these GHG reductions, Regulation 535/05 will help Canada meet its obligations ***under the Kyoto Protocol.***" - Backgrounder, Ethanol in Gasoline Regulation, Ontario Ministry of the Environment
International	"We couldn't take on ***the U.S. treasury, so [ethanol policy] was a solution***" - President, Ontario Agri-Food Technologies
National	"Through these GHG reductions, Regulation 535/05 will ***help Canada*** meet its obligations under the Kyoto Protocol." - Backgrounder, Ethanol in Gasoline Regulation, Ontario Ministry of the Environment
Regional	"31 per cent of ***Ontario's GHG emissions*** come from the transportation sector. This policy is the equivalent of taking 200 000 cars off the road" - Policy and financial advisor, OMAFRA "...we were subsidizing imported ethanol [from the U.S.]; the province had to take the lead on ***home grown ethanol industry*** ... We needed a made in ***Ontario plan***" - former Minister, OMAFRA
Local	"This is a boost for ***rural Ontario ...***" - quote from Ontario, 2004 "[Ethanol] policy had three goals: cleaner fuel, new opportunities and ***rural economic development***" - former Minister, OMAFRA "...***farmers*** were getting screwed ... [ethanol policy] was a solution" - President, Ontario Agri-Food Technologies

I will use the global scale and the local scale as examples that characterize the process by which a scalar premise is successful and the extent to which scalar forces are enabling. "***Under the Kyoto Protocol***", as part of a global scalar premise, indicates that there is some higher power that warrants – or even demands – a localized decision. It is not only based on scientific fact but also on political values (i.e., caring for the

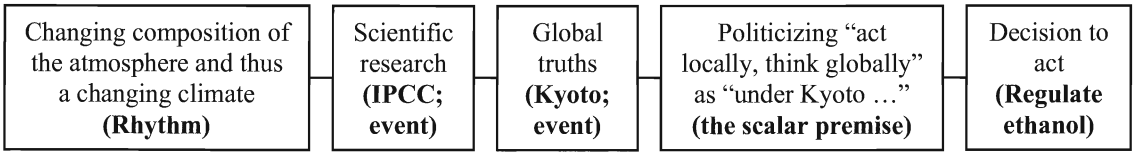
environment and for future generations). Consequently, the 'act locally think globally' mantra, or using corn for fuel to meet the commitments of Kyoto, allows political actors to change the material landscape through policy targeted at the global scale.[41] The decision is linked to the global scale, while the action (i.e., the policy implementation) operates at the regional and local scale. Further, to suggest that "***This is a boost to rural Ontario***" indicates that there are local issues that need to be addressed: something needs a boost only if it is failing. In terms of the local scale, a policy is set on the relative strength of the economy and how the policy will affect it. While the socioeconomic situation in Ontario is such that a policy-maker would have difficulty imposing regulations that would hinder the economy, it also enables the choice to regulate a fuel that will (conceivably) boost rural economies. Rural residents and the rural economy become 'winners', while the 'losers' are not identified. Given these examples, we can see that "scale itself is a representational trope; a way of framing political-spatiality that in turn has material effects" (Jones, 1998: 27). That Ontario's material landscape has and will continue to change is not only the result of regional decision-makers making a decision and policy-makers acting on that decision, nor of the forces at different scales I described in section 5.1. Rather, the material landscape is changed given the way in which the (politicized) body makes use of those forces through scalar premises in the negotiation and decision-making process.

Scale becomes a warrant in the technical sense of the term: it gives and receives reasons to achieve means and ends (i.e., develop a policy; see Toulmin, 1958). Scale thus

[41] This can be understood as a form of *green imperialism*, whereby a global environmental agenda is localized (see Harper, 2008: 205).

becomes a category of practice in that it enables decision-makers to reconfigure space.[42] I have attempted to illustrate this in Figure 5.5 below. Note that this diagram is extended in Figure 5.6.

Figure 5.5 Example of how scalar premises are used to link scales and enable a decision.



Understanding policy emulation: a cognitive approach

Whether understood as 'waves of innovation' (see Hagerstrand, 1952) or 'ideational mobility' (see Harrison, 2004), researchers have recognized that ideas flow through space and have the ability to change the material landscape. This section will discuss how policy ideas were mobilized in the form of policy emulation. Emulating policy can take a number of forms: the emulation of procedural elements, of substantive outcomes, of implementation styles or of its overall pattern (Howlett, 2000). By emulating ideas and implementation styles from other jurisdictions, policy makers use the structural power granted to certain jurisdictions as justification to employ the "do-what-the-majority-do" heuristic (also known as the 'social proof' heuristic). Following Kurtz (2003), I submit that policy-makers and decision-makers invoke 'scales of regulation' to define landscapes administered by distinct decision-making bodies (i.e., the scalar premise) and on that basis, "do-what-the-majority-do" (i.e., the policy emulation).

> "Experts from all ministries and their respective divisions ***form analyses*** of science and ***of other jurisdictions***, and center it on the Cabinet."
> - former Minister, OMAFRA

[42] A scalar premise is also a mechanism by which, rhetorically at least, local activists are connected to distant allies (see Nicholls, 2009 for other mechanisms). This will become more apparent in my discussion of policy as a networked process.

> "Before ***adopting a program that began in another jurisdiction*** – say, Manitoba or California – we have to ask if the solutions make sense for us. We also need to ask if it is consistent with everyone else … ***California is always out ahead and we tend to look to them first***. But we always have to ask: what would this mean for us?"
> - Senior Policy Analyst, Ontario Ministry of the Environment

These quotes suggest that policy ideas at other regional scales of regulation – California and Manitoba in this case – are used throughout the decision-making process. Indeed, they are used as justification for the decision itself and serve as a warrant for that decision. The successful use of a scalar premise (i.e., California being 'out ahead' which implies that they are progressing strategically and properly) is the mechanism by which policy emulation is successful. Policy-makers are thus able to "be a leader without taking risks" (Senior Policy Advisor, Ontario Ministry of the Environment). As such, Ontario was a 'second mover' in terms of ethanol policy (see Hoppe, 2000): they received the benefits of being perceived as progressive without the costs associated with either (1) being the first to act and bearing the cost of a steep learning curve or (2) acting last and being perceived as slow to move or 'reactionary'. This is especially important when the situation is uncertain – which Hammond (1996) argues is fundamental to *all* policy – and "informational spillovers" might save face for the second mover or translate into a more effective policy (Hoppe, 2000).[43]

The successful use of a scalar premise also allowed decision-makers in Ontario to bypass a scalar level (i.e., the national level: Canada) by relying on California and not waiting for Canada to agree on a regulation for the entire federation. California is often regarded as the most progressive jurisdiction in North America in terms of environmental

[43] I will return to the first-mover / second-mover relationship later as it relates to human rationality. Suffice it to say for now that this form of a scalar premise – eliciting a scale of regulation with which to justify policy – can be understood as a tool in the boundedly rational policy-makers' toolkit. "No individual [or even bureaucracy for that matter] has the resources to evaluate thoroughly all the choices he must make, so by conforming … he takes advantage of community leaders" who seem to have already passed the trial-and-error test (Chong, 1996: 56). I also contend that the use of a scalar premise is more likely to occur early in the lifespan of policy agendas (such as with *first generation* biofuels)

regulations, which is why Ontario would choose California as opposed to, say, Quebec or Canada. Given that California and Ontario recently signed a Low Carbon Fuel Standard (LCFS) agreement, it appears that this continues to be the case (see Ontario, 2007a).

In terms of policy-making in the technical sense of the term, policy-makers emulate because copying (in this case, Hawaii) is easier than invention (see Boyd & Richersen, 2002).[44] "One of the best ways to gravitate towards the complex ideas is to gravitate towards those who host those ideas" (Simandan, 2008b: 251):

> "The skeleton of the regulation was mostly ***taken from Hawaii***, but it was merged with the particularities in Ontario."
> - Senior policy advisor, Ontario Ministry of the Environment

Rather than devising a completely new scheme, policy-makers simply modelled the EGR after an existing one (Hawaii's). In the original draft of the policy, 'fuel supplier' referred to gasoline distributers. However, this meant that the point of compliance was such that gasoline may be double-counted. This was corrected in the second draft:

> Based on concerns raised through the Environmental Registry, the Ministry has amended the definition of fuel supplier to better reflect the intent of the draft Regulation. ***The Regulation is designed to capture every litre of gasoline sold in Ontario once,*** with the fewest number of compliance points, to ensure effective compliance enforcement and minimize overall compliance costs and the potential for market distortions. The definition of fuel supplier has been amended such that ***compliance is now determined based on ownership of gasoline and ethanol-blended gasoline volumes, rather than ownership of distribution facilities.*** Consequently, fuel suppliers will be required to demonstrate compliance at the company level, rather than for each facility. However, it will still be required that records be maintained at each distribution facility (or by total imports), for auditing purposes.
>
> -taken from Environmental Registry website: http://www.ebr.gov.on.ca/, Registry # RA05E0010

Similar to Ontario, Hawaii hosts an integrated gasoline distribution network. Once the decision was made (on the strength of scalar premises) and when policy-makers realized their first draft was ineffective in terms of quantifying gasoline sales in Ontario, it made

[44] This is an observation to better understand policy-making, not a critical assessment of the EGR. It is useful to copy because it cuts down on the time associated with searching and learning.

little sense to re-invent the wheel regardless of geographical differences, and thus policy-makers in Ontario emulated the implementation style of Hawaii.

That Hawaii and California were used as a warrant for ethanol regulation in Ontario and as the model for its implementation, respectively, seems to indicate that location and proximity are not powerful predictors of how and from which jurisdiction a policy is emulated. Policy emulation is as much cognitive as it is geographical. Indeed, in a world where we rely on others, more specifically policy-makers, to manage problems, "cognition related to the effectiveness of others becomes more important than direct sensitivity to one's surroundings" (Shapiro, 2008: 413).

It is important to note that these ideas were not unreflexively cast on Ontario:

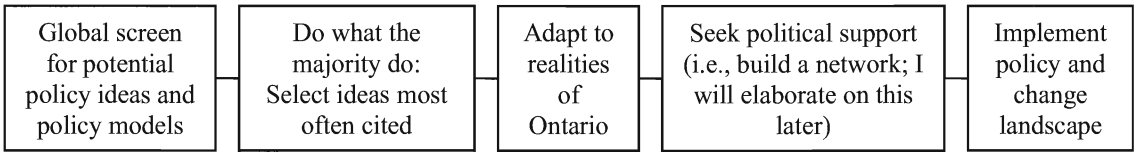
> "The decision-making process involves an analysis of all other jurisdictions to develop a ***'made in Ontario' plan***. We don't work in our own little silo."
> - former Minister, OMAFRA

While advocating for a 'made in Ontario' approach acts as an effective persuasive tool for decision-makers (see Harrison, 2003), in terms of technicalities for policy-makers, paying attention to one's jurisdiction is reflective of the fact that there are material and discursive particularities in Ontario that must be accounted for in the decision and in the policy:

> "The skeleton of the regulation was mostly taken from Hawaii, ***but it was merged with the particularities in Ontario.***"
> - Senior policy advisor, Ontario Ministry of the Environment

Such is emulated is diagrammed here. Note again that this is an extension of Figure 5.5.

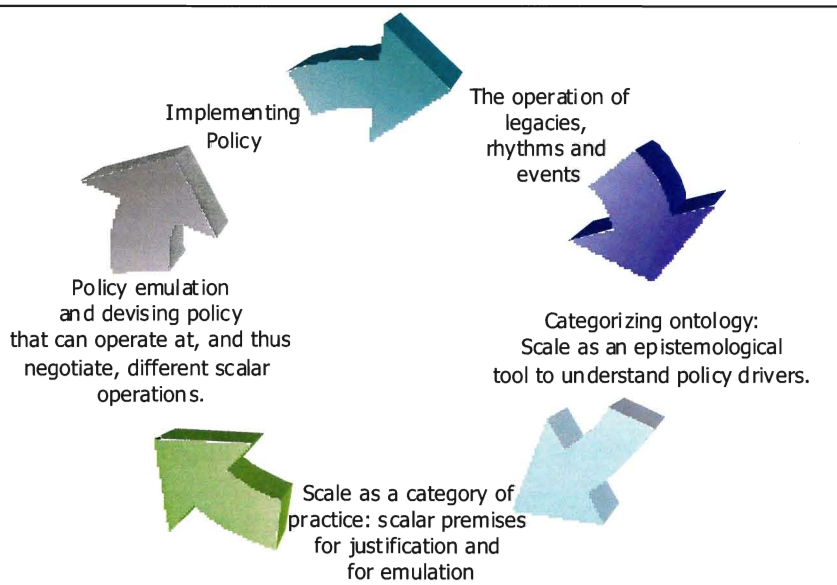
Figure 5.6 General mechanism of policy emulation from a cognitive and a geographical standpoint.



Summing up scale

A thick analysis of policy requires an analysis of large-, small-, and cross-scale balances of power (Adger *et. al*, 2003). I have taken this requirement a small step further to incorporate scale – and said balances of power – as a category of practice, or as an object of inquiry (Moore, 2008). By examining not only the operations of scalar forces, but the way in which they are tied to a course of action through a scalar premise and can then lead to policy emulation, I suggest that social (e.g., Kyoto) and natural (e.g., climate change) processes are ontologically intertwined and thus equally directive in the decision to regulate ethanol in Ontario. Figure 5.7 below is a suggestive rather than exhaustive condensation of the many ways that scale is implicated in policy, and brings out the fact that scale is a necessary geographical tool to explain the causal nexus of policy-making.

Figure 5.7 The relationship between scale as a category of analysis, as a category of practice, and policy.



5.4 Policy decisions and *re*-commodification: socio-natural interactions

Although a former Minister of OMAFRA stated that "the Premier is the ultimate decision maker" in Ontario, and a senior policy-advisor from Ontario Ministry of the Environment noted that "[a] commitment was made in the Premier's office to develop a renewable fuel standard, and that commitment was met", policy-making does not rely only on executive supremacy (i.e., hierarchical flows of power). There are more nuanced flows of power that help explain an executive level decision. In the previous section, I described how legacies, rhythms and events constrained and enabled decision-makers. However, recall that I argued in my theoretical chapter that "scale can only partly explain why a particular decision (in this case, the decision to regulate ethanol in transportation fuel) was chosen". This insufficiency can be overcome by complimenting an examination of scales with an examination of networks. Drawing on actor-network theory (ANT), this section will sort out the relationship between the drivers of change and the change that actually occurred.

> "Policy-making [and decision-making] is not a problem of a lack of ideas. But ***the pieces need to line up, and multiple drivers are needed to get those ideas off the table. These include commitments, plans, the economy …***"
> - senior policy analyst, Ontario Ministry of the Environment.

Until a network mobilizes – that is, until the pieces line up and multiple drivers are engaged – ideas lack agency. This is because they have yet to be enrolled by a stable, dense network. Ties are required to mobilize and bring agency to an idea: their power is not given *a priori*, but is rather a consequence of its relations to other actors. In this light, analyzing a policy network can help us determine not only why a decision was made, but why and how a *particular* decision was made: the creation of a network and the power therein acts upon space in a particular way (Murdoch, 1997 & 1998). It is important to

note that the network is not coherently, but rather contingently, forming "collective activities … between which powers are distributed, responsibilities are allocated, actions are constructed and spaces configured" (Murdoch, 1997: 334). These arrangements are "crucial to the enactment of political action" (Routledge, 2009: 201). Though I have already discussed the drivers in the section on scale, I want to come back to the same issue, but now from a different angle. The way of looking – or as Gregory (1994) would say the 'geographical imagination' – is different here. Policy is not explained by context and drivers alone, nor by how actors are framed or used, but by how they are *connected* to each other and thus defined by one-another. Policy is the contingent outcome of *net-workings.*

This network began to take shape in the early 1990s when Commercial Alcohols began producing ethanol as an oxygenate for Suncor. Oxygenates were added to gasoline to limit carbon monoxide (CO) emissions and reduce urban smog. In the late 1990s, Jim Johnson, a corn producer from Alviston, became president of the Canadian Renewable Fuels Association, thus linking Ontario's corn-producing community to a national renewable fuel lobby. Canada's Alternative Fuels Act, 1995 (Bill S-7), legislated that 75 per cent of federal government and crown corporation vehicles run on renewable fuels by 2004 – ethanol was recognized as an important source to enable this legislation. The AFA is an important 'immutable mobile' because it established and solidified the connection to the national government and defined the identities of various actors prior to provincial negotiations (e.g., corn was already beginning to be viewed as fuel). Local MPPs began to take notice of this growing network:

> The use of ethanol-blended gas makes sense for many reasons. It would improve the quality of our air in large urban centres such as Toronto by ***replacing*** environmentally hazardous compounds such as lead, ***MMT and aromatic hydrocarbons now being used as octane***

> ***enhancers***. It would reduce the need for increasingly expensive megaprojects to increase domestic supplies of light crude oil. Its benefits to agriculture are substantive and ***could improve farm income in Ontario***. It would be a ***home grown solution*** to a major pollution problem.
>
> - Mr. Villeneuve (MPP, Stormont - Dundas and Glengarry) speaking in the 34th Ontario Legislative Assembly (1989-1990)

The term 'oxygenate' used previously, and 'octane enhancer' used in this quote, are informative because at that time ethanol was discursively constructed as a solution to the smog problem in major urban centers. But ethanol production was not linked to smog reduction alone; it was also "bootstrapped to the problems that MTBE [a commonly used oxygenate] was posing to water supplies" (senior policy advisor, Ontario's Ministry of the Environment). These problems demanded that new oxygenates be developed, and thus we can see how the early formation of the ethanol network was mobilized by the intercession of important rhythms and events: increasing smog and a moratorium on MTBE. However, the rationale for oxygenates was losing weight as newer fleets of vehicles were designed to regulate airflow in their engines and to capture unburned fuel, thus making added oxygen content in fuels less of a priority. Additionally, the Fleet Services of the City of Toronto, citing David Pimentel (1988, 1991 & 2003), argued through e-consultation that "Through evaporation [ethanol can] ***increase*** emissions of volatile organic compounds, which can contribute to ozone formation and ***smog***" (Fleet Services of the City of Toronto; posting number 18, Registry number RA05E0010). This sentiment was shared by a member of *Canadians for Renewable Fuels* who commented in the questionnaire that "aldehyde production from engines using ethanol fuel will be huge".[45]

[45] An aldehyde is a volatile organic compound (VOC) caused by the oxidation of an alcohol. Since ethanol is an alcohol, and most internal combustion engines do not burn 100% of their fuel, there are concerns that un-burned ethanol will be *more* rather than less harmful in terms of contributing to smog and respiratory diseases. An aldehyde is not a pollutant that we control through explicit emissions regulations.

Even though the network was beginning to be contested, broader environmental issues began to enrol and mobilize a wider set of actors.[46] Scientific research (e.g., Rogner, 2000; Shapouri *et al*, 2002 and also that produced from Natural Resources Canada through its modelling program, GHGenius) showed that ethanol consumption would reduce oil dependence and CO_2 emissions: ethanol thus became a solution to greater problems at greater scales. Given that these scales are elicited through scalar premises, and the clout of scientific research (e.g., the IPCC), significant ties bound ethanol producers, corn producers, global warming and fossil fuel independence. The story of ethanol regulation in Ontario, then, is of a network that tied industry, renewable fuel lobbies, corn producers, international treaties, chemical compounds, nations, sub-national jurisdictions, legislation, and scientific communities around the world (refer back to figure 5.8), as they all folded and circulated around the need for renewable fuels given the pressure of seemingly 'outside' legacies, rhythms and events.[47]

Starch is an important component of this network.[48] Starch acts as an intermediary for the actions of other actors who enrol it to transform themselves, in many ways intentionally, given economic viability. Transportation fuel suppliers are transformed into environmentally conscious businesses, and corn farmers into transportation fuel suppliers. Because of its starch content and the proliferation of starch-to-fuel technologies, corn became part of the 'collective activities' of a unique and expanded set of actors other than simply consumers of food and members of the agricultural

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[46] This focused the debate elsewhere, though still oriented toward the concerns of the public.

[47] I attribute the network strongly to the intercession of legacies, rhythms and events because ethanol is not an innovative idea. Indeed, Henry Ford's first car was powered by ethanol until oil was favoured due to its efficiency, abundance and mobility. The drivers, and the way they mobilized this network, best explain why ethanol is again being used as transportation fuel.

[48] Starch is found in all plants in various quantities: it acts as an energy store. Starch is fermented to produce the alcohol-fuel ethanol.

community.[49] Corn was suddenly enrolled by the energy and the environmental community, and these groups formed stable 'links'. Of utmost importance here is the discursive process of re-commodification which transforms the identities and values of a product (see Bakker, 2005; Dibden & Cocklin, 2009).[50] Though often understood as a process of neoliberalization (see Peck, 2004), commodification can also be understood as the result of net-workings (Prudham, 2009). As corn became connected to GHG mitigation, reduction of dependence on oil, a slumping corn industry, and economic development, the ethical value that is placed on using corn for fuel production rather than food production, and thus the monetary value of corn as it is split between the transportation and the food-processing sectors, increases.[51] Corn's multiple meanings (as fuel, as food, as CO_2 mitigation, as an alternative to oil, etc.) were performed by various actors to give it a singular meaning: corn thus became ethanol; it wasn't a fuel until the intercession of various legacies, rhythms and events mobilized and circulated within this dense and heterogeneous actor-network. However, the circulation of these various identities and of the power that was produced by enrolment was heavily mediated by money, because it offered a significant will-to-connect. If corn-based ethanol was not understood to be economically viable, and if the technology was ineffective, the network would fall apart. This is why cellulosic ethanol is not yet a powerful actor. Though it has

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[49] It is important to note that if Ontario farmers were able to grow sugarcane, this surely would have been the crop of choice because of its higher and more accessible starch content. However, given particular climatic rhythms, and the fact that it is a desirable grain with which to feed domesticated animals, corn dominates the landscape. In this way, the physical landscape has agency, silently shaping the specifics of the policy and of the way the network took shape.

[50] An entity is not born a commodity; it becomes a commodity through association (Callon, 1999).

[51] What we are seeing in recent backlash against the ethanol industry, I think, is the realization that its symbolic value diverged from a humane way to use corn. Ethanol as a climate change mitigation strategy set corn in a global context for the purpose of GHG reduction, rather than setting it in a global context to reduce hunger and starvation. Given this backlash, commodification is transitory, "not a durable state but a series of passing moments", imbued with symbolic as much as economic meaning (Sayer 2003: 345).

potential beyond corn-based ethanol, that potential will not be realized until money generates a will-to-connect (it is more costly to produce cellulosic ethanol given that the technology is immature). Ultimately, "if something like this isn't viable economically, forget it" (President, Ontario Agri-Food Technologies).

That the actor-network connected to other jurisdictions (e.g., California) and a global commitment (e.g., Kyoto Protocol) through scalar premises meant that the policy network, and also the commodity circuit, could expand spatially. ENGOs (e.g., Ducks Unlimited), agricultural market advocates (e.g., Ontario Agri-Food Technologies) and ethanol suppliers (e.g., Greenfield Ethanol) enrolled corn as a solution to the problem posed by these drivers. They were able to politicize and validate this enrolment with the help of the part of the scientific evidence that argues global warming is a real phenomenon (e.g., IPCC) and that corn-based ethanol production reduces GHGs and a fair return on energy (e.g., Farrel *et al*, 2006; GHGenius). Here, we see a mediator – science – that is less anecdotal than a scalar premise, and less 'interest-based' (i.e., science has the luxury of appearing more objective) than money, giving it significant ability to impart power to the actants that engage it. I have attempted to illustrate the network, its connections, its mediators, and ultimately the ways in which multiple meanings gave corn-based ethanol regulation agency in Figure 5.8 below. This illustration is suggestive rather than exhaustive, particularly in terms of the mediators involved.[52] And it is important to note that I am not implying anything by placing corn at the top of this image, but rather structure the illustration this way to demonstrate that the policy network circulates around corn, is mobilized by various drivers, and has folded

[52] The mediators that are represented are those that I found to be most important in terms of stabilizing the network by imparting difference and sameness to the actors involved.

into an institutionalized policy (or what can be labelled an immutable mobile in ANT terminology – see Latour, 2005 – and as an event in recursive cartography terminology; see Simandan, 2006), by which the actor-network will continually be performed. I will theorize more about 'spaces of engagement' later.

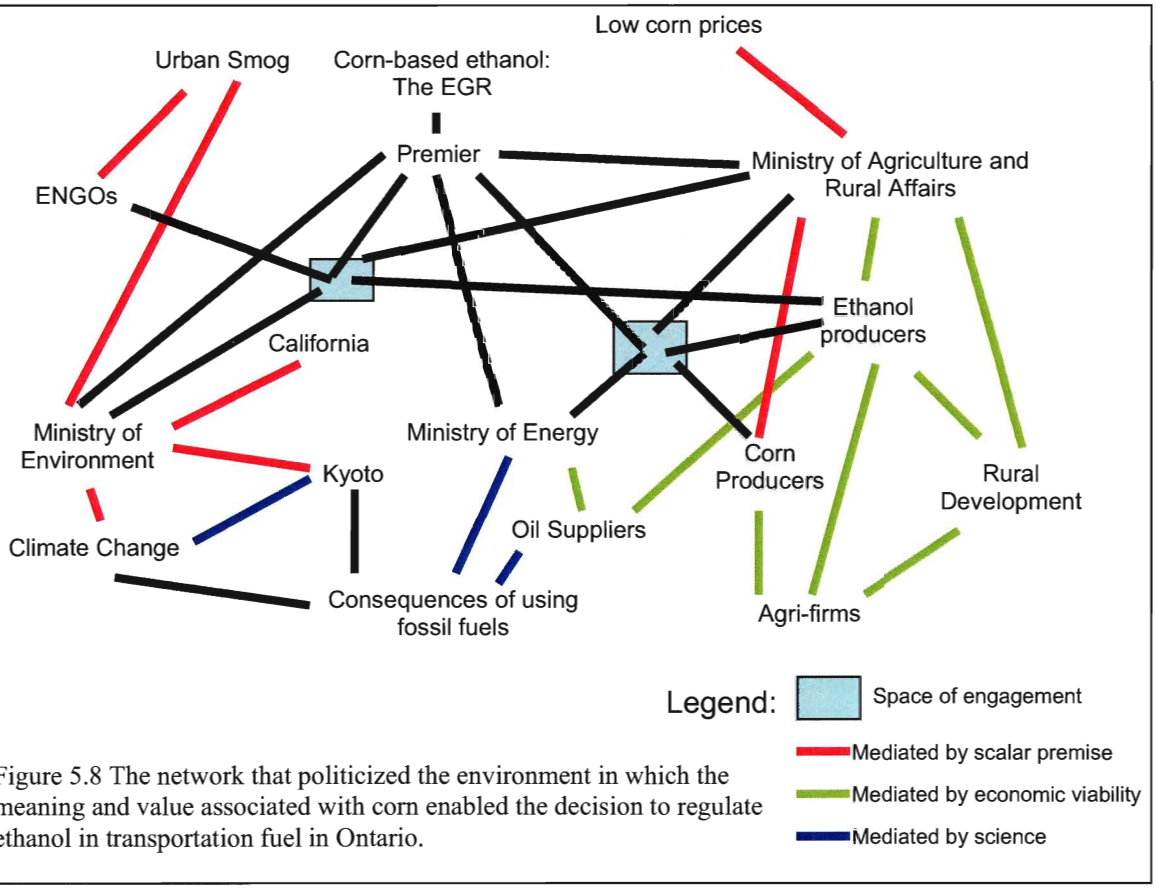

Figure 5.8 The network that politicized the environment in which the meaning and value associated with corn enabled the decision to regulate ethanol in transportation fuel in Ontario.

Once this network circulated within the jurisdiction and purview of relevant ministries (e.g., OMAFRA, Ontario Ministry of the Environment, Ministry of Energy) and thus under the Premier, the network was coordinated and aimed to configure the actions of its users (i.e., it was legislated) and thus became an actor itself, hence the term actor-network (see Murdoch, 1998). This is because (a) it commanded power as a solution to a number of problems defined and politicized by an extensive and dense network (i.e., multiple meanings turned into singular meanings which could be easily

defined by the policy document as an immutable mobile) and (b) different ministries were no longer competing for resources because they had aligned themselves and were benefiting mutually through an expanded commodity circuit.

Regardless of the relational flows of power in which actors enrol and represent one another, this power must be canalized to reach the Cabinet and the Premier's office:

> "Experts from all ministries and their respective divisions form analyses of science and of other jurisdictions, ***and center it on the Cabinet.***"
> - Former Minister, OMAFRA

The Premier's office, and the political structure of Ontario, coordinates political action in the network. We can think of the Premier's office as a power transformer: the power of the network is coordinated into a policy decision, and recast as something more stable and more powerful (I will elaborate on this in the next section).

Network building and deliberative democracy

It was difficult to examine the democratic nature of the actual *decision*-making process given the relationship between scale, accountability and candidness as illustrated in Figure 3.1. Attempts to expose the key players *before* the decision reached the policy-making stage were largely futile. However, the OEN offers interesting insight into the deliberative character and of the role of ENGOs in the decision-making process. This section acknowledges Routledge's (2009) claim that it is important to study the reasons why political and social networks are put together. It also focuses on the ties that are created between governmental agencies, (E)NGOs and industry by discussing the spaces of engagement.

> "***Key industry stakeholders, as well as health and environmental organizations,*** were consulted during the drafting of [the EGR]. ***We listened*** to their concerns and employed their comments ***to strengthen the regulation***"
> - Backgrounder, Ethanol in Gasoline Regulation, Ontario Ministry of the Environment.

In the case of Ontario's ethanol regulation, a deliberative network was formed to 'strengthen' it in two ways: by logically connecting the objective to the actions that would be necessary to achieve it and by acquiring legitimacy through (claims to) deliberative democracy and stakeholder input. In the first instance, the democratic structure of the policy-making process is instrumental to the goal the policy intends to achieve: to replace five per cent of Ontario's transportation fuel with ethanol. The advisor charged with drafting the EGR had to answer a question: "What is the point of compliance?" (senior policy adviser, Ontario Ministry of the Environment). A network circulated around this question. It included the member from the Ontario Ministry of the Environment and three other members; two of whom represented large and small oil distributors, respectively, and a representative of the renewable fuels community.[53] The question, then, is a powerful focal point because it organized a very particular set of actors in the network and thereby excluded others.

Once the logistics were worked out (policy-making in the technical sense of the term) e-consultation through Ontario's environmental registry ensued to strengthen the regulation in the second sense: to bring legitimacy, and to calculate the multiple meanings so that they may be imparted on the idea to solidify and maintain the network. The environmental registry was set up as per the requirements of Ontario's Environmental Bill of Rights (EBR), which ensures that multiple voices have access to the policy documents. It offers a space of engagement for critical scrutiny with direct orientation toward the decision, and is thus a useful 'centre of calculation' (in ANT terminology; see Latour, 2005) because it (a) defines all members of the public as a

[53] Given that these groups did not want to participate, I am bound by my ethical requirements and am unable to specify who these groups were. See Butz (2008) on how ethical requirements cause epistemic losses.

(potential) party in the policy-making process which offers significant legitimacy, and (b) gauges the variation, or flux, among the seemingly disconnected voices of various stakeholders. If actors did not engage this registry, they (and their agenda) had little power. Political power inequalities within networks, then, are partly the result of agents bypassing, or failing to engage and connect with, crucial nodes in the network:

> "The essence of the Environmental Bill of Rights is to ensure that the public is consulted prior to forming any new environmental legislation. The registry is set up for this. ***If stakeholders felt they were silenced, a large part of the reason for that is because they did not use the registry to their advantage."***
> -former Ministry, OMAFRA

Of the 26 parties that commented on the draft regulation, only six were *not* affiliated with the oil industry. One of the most compelling discoveries of this research was a lack of ENGO involvement in the democratic process. The purpose of ENGOs is to be a voice for civil society to ensure that environmental concerns are being met by government and industry. Given that only three agencies used the registry to their advantage, and given a very low response rate from my questionnaires, it is clear that this voice was lacking. *For the most part they were not silenced, but silent*: "[ethanol] didn't seem to be on [ENGO's] radar at the time [the regulation was being drafted]" (senior policy advisor, Ontario Ministry of the Environment). The members who did engage the registry – Ducks Unlimited, Sage Center and the Sierra Club – defined themselves as stakeholders and were able to shape the policy:

> ***Some comments received through the Environmental Registry*** [made by the ENGOs mentioned above] ***suggested that, based on the existing scientific literature, the regulatory bias in favour of cellulosic ethanol is too conservative.*** Stakeholders have suggested that the bias should be increased to further encourage and maximize potential environmental benefits. Comments also noted that the approach taken in the United States' recently passed Energy Policy Act of 2005, uses a multiplier of 2.5 for cellulosic ethanol.
>
> Response: A review of the scientific literature provides evidence that cellulosic ethanol can reduce greenhouse gases by a range of approximately 1.5 to 3 times more than corn-based ethanol. The draft regulation was conservative. Based on comments received through the Environmental Registry, ***the Ministry has amended the Regulation, such that the bias in***

> ***favour of cellulosic ethanol has been increased from 1.5 to 2.5*** (i.e., 1 litre of cellulosic ethanol is equivalent to 2.5 litres of ethanol produced from other feedstocks for compliance purposes).
> -taken from Environmental Registry website: http://www.ebr.gov.on.ca/, Registry # RA05E0010

Ironically, it was the Fleet Services of the City of Toronto – a city where smog is a major problem – that contested the fundamental idea of ethanol in gasoline instead of merely scrutinizing the technicalities of the policy:

> "Critics such as David Pimentel of Cornell University point out that it takes 1.3 gallons of oil to produce one gallon of ethanol … Through evaporation [ethanol will] increase emissions of volatile organic compounds, which can contribute to ozone formation and smog."
> - Fleet Services of the City of Toronto; posting number 18

Though this actor made a connection to dissenting science and argued against the scientific consensus that served as the foundation of ethanol regulation, no other actors engaged (including the member from *Canadians for Renewable Fuels* who participated in the questionnaire and shared similar concerns, but did not use the registry) and thus the opposition remained weak. Also, not only was this actor was an 'outlier' in the network, but the ties that may have been weakened by this opposition were balanced by stronger ties to GHG reductions and alleviation of dependence on fossil fuels.

Although institutional mechanisms to foster deliberative democracy seem to be in place, these structures alone have little power until stakeholders engage them. Deliberation, which calls for stakeholder input, is dependent on whether those who should be actors (and I have no reservations about saying that ENGOs *should have* been more prominent here, to address the gaps left by government and corporate agendas) recognize their position in the network and take advantage of it. The very low response rate received from my questionnaire sent to 83 ENGOs, triangulated with an analysis of the registry comments and the discussions I had with policy-makers, clearly indicates that the ENGO community had very little 'expertise', or very little to offer decision-makers.

The importance of the Environmental Registry should not be understated: McArthur (2007) points out that more jurisdictions are resorting to e-consultation as a way to incorporate the concerns of stakeholders, and so these stakeholders must take advantage of Registry as an online 'center of calculation' whereby stakeholders and issues can gain momentum. E-consultation, and the use of virtual space, ensures that engagement is just as critical as proximity as a determinant of power; it is a space where seemingly distant actors can make connections. Such engagement prior to the regulation being enforced was severely lacking. This may surprise those who are basing opinions on the democratic nature of the policy process on the strong voices that are only recently materializing in the mainstream media (see Table 3.2, and also Auld, 2008).

Summing up network

The need for political change, or the formation of a policy window, is driven by the intercession of legacies, rhythms and events at different scales and by eliciting those scales via scalar premises. However, legislative change is the result of the *interaction* of agents (Harper, 2008: 223). By examining the policy network one can analyze how the drivers behind the need for change are translated into specific policy choices. Analyzing these heterogeneous associations makes it obvious that environmental policy is never simply, or only, environmental (Castree, 2003). It is promiscuous in two senses. First, the actors involved came from all sectors of society, not all of whom represent environmental concerns.[54] Indeed, decision-makers and policy-makers must be attentive

[54] I should point here to a publication (Canada, 1997) from an ethanol research and development workshop conducted at the national level. Of the 49 individuals that comprised various committees, only ***one*** person was directly affiliated with an environmental group. The remaining members were from Agriculture and Agri-Food Canada, Natural Resources Canada, and oil / agriculture firms. Of symbolic importance is the fact that the Ethanol Program Advisory Committee was chaired by a member from Mohawk Oil. While this is not directly representative of the ethanol network in Ontario, it is certainly indicative of the lack of 'environmental' individuals and voices that constitute an ethanol-based network.

to specific circumstances and how various interests will be affected by their decisions (Lifkin, 1994). Second, the outcomes of the policy – generating rural revenue, offering jobs, contributing to energy supplies – were not necessarily environmentally inclined (in fact, some would argue they are antagonistic to the true values of environmentalism). To effectively enrol actors to push an agenda and push back against scalar forces, the network must be organized in such a way that it can mobilize against a particular problem with a particular solution. This mobilization was paramount in the decision to regulate ethanol in transportation fuel: it strengthened the regulation by linking actions to objectives and by enrolling all interested parties, thus being democratic.

As stated above, we can think of the Premier's office as a power transformer: the power of the network was gauged to the extent that it lifted an idea off the table, and was recast as something more coordinated that (a) had ability to alter the material landscape and 'push back' against the forces that mobilized it in the first place, hence the term actor-network, and (b) mobilized political resources in the form of government sponsored campaigns as the network was constituted as a single entity in various policy documents and media announcements (see, for instance, Ontario, 2007b). Additionally, it is important to note the relationship between engagement and power. ENGOs that are opposed to the regulation of grain-based ethanol were not silenced, as recent conspiracy-oriented media sources might suggest, but were *silent*. E-consultation offers a center for calculation that is not place-based, and ensures that proximity is not the sole determinant in terms of the capability of networks and agents to engage and mobilize resources within the policy-network by offering a 'virtual' space of engagement. However, many agents bypassed this crucial node.

Overall, we must be careful to avoid obscuring differences whenever using ANT (see Castree & MacMillan, 2001). Unlike a theory that incorporates legacies, rhythms and events, the imagery provided by ANT – a flat or horizontal ontology – has difficulty attributing causal force, particularly to phenomena that are not site specific. As such, though analyzing a policy network is useful in determining how a particular idea was adopted, it needs to be supplemented with a scalar epistemology. However, unlike the imagery of a scalar epistemology, the imagery provided by 'network' allows us to understand individuals – human and otherwise – as agents that can generate change.

The discussion here indicates that there are three moments of network formation: its beginning as it is mobilized by legacies, rhythms and events that enable and constrain given connections; its amplification which is characterized by the way it becomes an actor itself as it takes on new meaning; and its stability which is the result of canalization through the Premier's office (and subsequent government investments), and the density of the network particularly in relation to its (lack of) opposition. However, the stability of policy-networks is compromised by uncertainty and unavoidable justice.

5.5 Uncertainty and ethanol regulation: insights into human rationality

Policy encompasses the things governments do intentionally in order to achieve social change (McArthur, 2007). Hammond (1996) argues that although policy strives for direction and control, uncertainty is irreducible and thus injustice (i.e., unintended policy outputs) is unavoidable. Unintended policy outputs are partly the result of the fact that truths and conditions can change. Added new premises can undermine previously entrenched conclusions, and completely change the context in which a decision was made. This was validated throughout my empirical research on a number of fronts. The

following discussion will revolve around the recognition of uncertainty by policy-makers and the reason why a decision was made given considerable dissenting science and some dissenting voices in the deliberative process. First, I will begin with the broad contours of how 'truth speaks to power' in Ontario and of the scientific debate regarding ethanol as a GHG mitigation and an oil-dependency alleviation measure.

> "...experts from all ministries and their respective divisions ***form analysis of science ... and center it on Cabinet office***"
> - former Minister, OMAFRA

> "Together with my other colleagues, ***I keep the government abreast of science***"
> - senior policy advisor, Ontario Ministry of the Environment

These quotes make it clear that policy decisions in Ontario consider the science of the time. A brief discussion of the academic debate surrounding ethanol before the regulation was passed is warranted here. The papers reviewed were chosen based on authors cited by the members of government during the interviews (see Hammerschlag, 2006, Farrell *et al*, 2006 and Auld, 2008 for other reviews). First, the energy return on investment was ambiguous to say the least. Results from studies are sensitive to a number of factors, including – though not limited to – the incorporation of 'upstream' and 'downstream' by-products generated from ethanol production, the distance travelled by the feedstock, the type and variety of grain used and the type of fuel used to power the bio-refineries. Scholars such as Pimentel (1988, 1991 & 2003) and Patzek (2004) were arguing that the net return on energy was negative, while Rogner (2000) and Shapouri (2002) argued that when co-products were taken into account (e.g., dried distillers grains), the energy return was positive.

In terms of any GHG benefit the literature was equally ambiguous. While atmospheric CO_2 emissions from ethanol combustion would be filtered by the growth of

the following crop and result in a reduction of GHG emission from tailpipes (Wang *et al*, 1999; Farrel *et al,* 2006), an intensified soil carbon stock depletion (Lal, 2004) and increasing infrastructural development, all as a result of a greatly expanded agricultural sector, may 'wash' these gains and render ethanol production unsustainable (Patzek, 2004). Again, however, Rogner (2000) and Shapouri *et al* (2002) were arguing quite the opposite. The purpose of this very brief review is to demonstrate that at the time the decision to regulate ethanol was made, there were already two opposing sides to the academic debate. How, then, did decision-makers decide?

> "***Patzek and Pimenetel*** (the main academics who opposed ethanol production) seemed to use old data and did not account for the generation of co-products. ***They were, and still are, considered outliers"***
> - Senior policy advisor, Ontario Ministry of the Environment

As this quote demonstrates, policy-makers favour measures of central tendency when it comes to choosing the science on which to base a decision, and tend to disregard science that is well outside of the mainstream.[55] These were not the only reasons the decision was made in the context of uncertainty, however.

Overlooking uncertainty

Ethanol regulation will produce desirable outcomes in Ontario. It will open new markets for corn producers, ensure long-term infrastructural investments in rural communities, expand employment opportunities and set a path toward the next generation of renewable fuels. Policy-makers and decision-makers hope to be held accountable for such results. Consequently, when evaluating the science, the judgement of decision-

[55] It is important to note that Pimentel's publication in 2003 *did* use updated statistics unlike his earlier reports, and also argued that those who were counting co-products in the energy return were *not* counting some of the upstream inputs (such as labour power). Furthermore, co-products (the nature of which is dependent upon whether or not a wet-milling or a dry-milling process is used) were outstripping their need, and are thus in danger of becoming wastes. I should also note that CO_2 is counted as a co-product in some of the reports that policy-makers relied on. It is condensed and sold to greenhouses (personal communication, President, Ontario Agri-Food Technologies). Pimentel and Patzek, for obvious reasons, have a difficult time attributing a positive sign to CO_2 production as a co-product.

makers in terms of selecting science on which to base their policy agenda was clouded by their emotions (Clore & Huntsinger, 2007; Pronin, 2007). They did not seem to be examining the science as impartial judges, intent on arriving at a conclusion based on the weight of pros against cons, but as one-sided lawyers, choosing science to defend a decision that would bring them pleasure for being part of something that would produce desirable outcomes. There was a bias to ignore that which they did not want to hear, and thus the science *for* ethanol production was more heavily favoured, because it encouraged action as opposed to inaction.[56] The full awareness of the reality that bio-fuel production and regulation was contested on both value differences and scientific deficiencies was undermined by the 'pleasure principle': when reality is ambiguous, contentious and uncertain, decision-makers selectively notice and remember those aspects of reality that are likely to bring them pleasure. While I would not go to far as to say that "the prime problem of politicians is not to serve the public good but to get elected to office and remain in power" (Sowell, 2002: 168), I argue, based on the fact that the policy moved forward in the midst of dissenting science and other voices, that the incentive and desire for accountability inherent in appeasing a powerful and dense network trumped an adaptive need for truth, and thus the pleasure principle dominated the reality principle. Politics and policy-making in the context of ambiguity or uncertainty favours the operation of the pleasure principle over the reality principle, and thus action was taken before the full story was known.[57]

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[56] This process of how 'power listens to truth' is analogous to "venue shopping", a phenomenon observed during federal environmental policy-making whereby state actors choose among a set of policy networks from the various levels of government that best align with their interests (Montpetit, 2002).

[57] Freud (1920: 4) states that "Under the influence of … self preservation, the pleasure principle is replaced by the reality principle". The reality principle is the adaptive need for truth. As academics, it would be ethical for us to ensure this principle dominates our professional endeavours. As politicians whose pleasure is mainly derived from the benefits (notably in terms of self-esteem and financial security) of appeasing

Of the three public officials I interviewed, none of them felt any pressure from the federal government to pass ethanol legislation, and the only tangible link was between the EEP and the OEGF: provincial ethanol producers can tap into both funding programs. However, some respondents – who wish to remain detached from this sentiment – agree that the motivation to regulate ethanol ahead of the federal government to gain credibility and accountability played a role in the policy process. On a global scale Ontario is a 'second mover', but on a smaller scale (i.e., national) they wanted to be perceived as a 'first mover' (see Hoppe, 2000 and refer back to section 5.3 on policy emulation). This insight might be important for students of federalism, who argue that federal political structures encourage policy learning, be it through cooperation or competition (Bakvis & Skogstad, 2008; Harrison, 1996). This can be complemented with the explanatory power of the pleasure principle: federal-provincial relations at the scale of the individual are regulated by the pleasure principle, motivated by the fact that information is limited, in cases where provincial politicians can bypass their federal counterparts.

That the decision was made in 2004 amid considerable scientific debate was one thing. That the decision evolved into policy-development in 2005 despite controversy also requires explanation, and for this Elster's notion of the 'power of pre-commitment' is helpful (see Elster, 2000 & 2007). Table 5.1, the reader might recall, summarized the campaign promises of the 2003 platform for all three major parties. Each party committed to the development of biofuel production as a means to boost rural economies and alleviate concerns for corn producers and fuel consumers. Decision-makers who formed Ontario's government (the Liberal Party) were subsequently bound by these

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their constituents, the reality principle is more easily obscured and ignored when it conflicts with the pleasure principle. This suggests that the regulation of the pleasure principle over human action is dependent on the 'decision environment'.

commitments, and thus policy-makers developed the most feasible implementation process. Changing one's mind, or being a 'flip-flopper', is a damaging stigma in the political arena, especially Canada's. Politicians are expected to stick to their promises despite changing premises and the growing recognition of uncertainty: their image as *public figures* makes it difficult to change their mind even in the face of sound reason (Smith, 2003), and thus publicity serves as a device for pre-commitment.[58] Irrational as it may be, Canadian politicians are better served by succumbing to the power of pre-commitment than by updating their views (particularly when the caucus demands it; an important insight for those who study the effects of 'party politics': see Bakvis & Skogstad, 2008).

Changing truths

Regardless (or, as a result) of the consensus generated by GHGenius and a dense network, and of the power of pre-commitment and the operation of the pleasure principle, decision-makers and policy-makers were not certain. The senior policy advisor from Ontario Ministry of the Environment continued to wonder: "where is the science going to land on this?", knowing that uncertainty is central to his decisions and those of his superiors. Currently, grain-ethanol science seems to be at odds with the rationale for the prodigious growth in the ethanol industry and in governmental regulations. While the environmental warrant for ethanol production lay in the fact that it will reduce CO_2 emissions from the tailpipes of automobiles that run on ethanol blends, scholars post-

[58] It is important to note that Elster does not explicitly identify campaign commitments as a reason or a device for pre-commitment, but it can certainly be conceptualized this way. A campaign promise is made at time A, in order to reach a desired goal (being elected, which is the *reason*). Its publicity is a pre-commitment *device* that ensures that the future will not be discounted – and that the policy agenda will forge ahead – regardless of the 'changing truths' between time A and time B (i.e., the time when the policy is implemented). It is a device in the sense that it imposes a cost: the cost of being stigmatized as a 'flip-flopper'.

2005 are pointing to damaging indirect effects. Searchinger (2008) found that to grow enough corn to fulfil government ethanol mandates, sequestered carbon would be emitted through land clearing at a magnitude that would outweigh the gains made from burning ethanol instead of fossil fuels. Hill *et al* (2006) and Crutzen *et al* (2007) argue that increased nitrous oxide (N_20) and methane (CH_4) releases as a result of a greatly expanded agricultural sector may counterbalance any changes to CO_2 releases. These studies, and a host of others (see Gardner & Tyner, 2007, Pimentel *et al*, 2007, Fargione *et al*, 2008), indicate that grain-ethanol has considerable and noteworthy environmental pitfalls when produced at a scale sufficient to replace a significant proportion of petroleum use.

> "The prevailing wisdom … at the time that the regulation was being developed ***did not focus on the effects of scaling it up***. ***The land change issue throws everything into the air***; the context suddenly becomes much different."
> - senior policy advisor, Ontario Ministry of the Environment

Neglecting to 'scale it up' seems now to be a mistake; one that land-change scientists argue governments regularly make (see Turner *et al*, 2007). Using 'climate change' mitigation as the environmental focus seemed to have focused the attention of science, decision-makers and policy-makers on atmospheric economics from the tailpipe as a policy-relevant metric, while the range of issues, including changes to land-use and land-cover, are more diverse than this focal point. Reducing the situation to such focal points neglects the ramifications of the decision at different scales.

Another compelling fact about the situation was that very few options existed in terms of reducing CO_2 emissions from the transportation sector (Zhang *et al*, 2007). Political pressure was mounting to take action toward the commitments made by Kyoto. When the Premier committed to renewable fuels in the campaign platform of 2003, and

decided to fulfil that commitment with an announcement in 2004 and an official regulatory scheme by 2007, policy makers had to act quickly:

> "I am comfortable in saying there were different scientific views, ***but ultimately we had to make a decision***"
> - former Minister, OMAFRA

> "There is ***no luxury of certainty or time*** when it comes to matters of the environment."
> - senior policy advisor, Ontario Ministry of the Environment

Given this sense of urgency, policy-makers, particularly when it comes to complex matters, cannot optimize (i.e., they cannot choose the best option). They are bound by constraints of time and uncertainty, and must decide within those bounds. A sense of urgency and an inability to grasp a problem that is computationally intractable require that policy-makers 'satisfice' (see Simon, 1955 & 1996), which means they choose an option that appears to them to be *good enough* given the circumstances, especially under the power of pre-commitment.[59] Indeed, grain-ethanol production was not understood to be the 'silver bullet', but an incremental change that would lead energy producers and consumers down a renewable path:

> "***Ethanol was part of a larger strategy***. There was always a recognition that corn-based ethanol was ***not a final solution, but a path somewhere***"
> - former minister, OMAFRA

> "[Ethanol] is a ***start to move into the next generation*** of biofuels"
> - Financial and policy analyst, OMAFRA

In the decision to regulate ethanol we see the manifestation of strategic behaviour of collective agents. It was not only rationalized on the basis of the pleasure principle, on the power of pre-commitment, nor on the level of certainty found in the science of the time. It was a 'waiting' strategy in an effort to find a 'global maximum' – i.e., the best possible choice of all the choices available – by choosing a 'local maximum' (i.e., satisficing) that for now seems to be good enough, but will later prove fruitful. This can

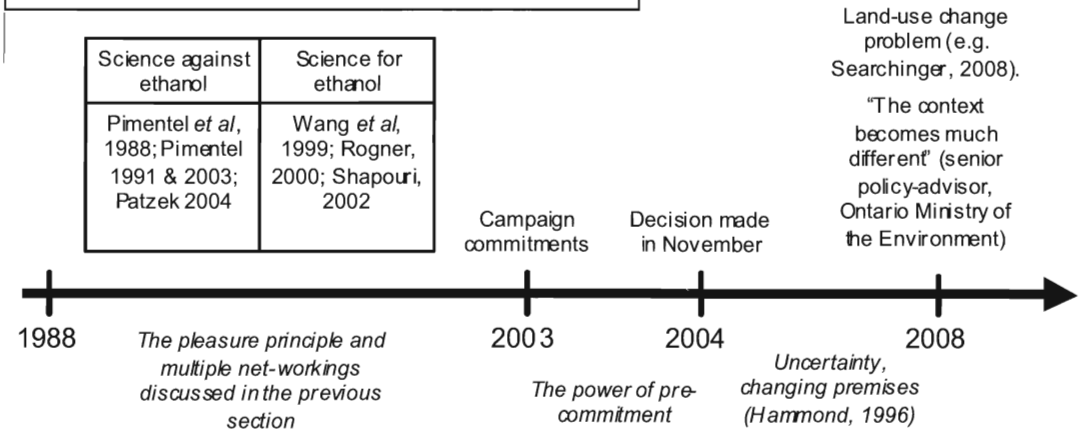
[59] It is important to note that aspiration levels fall as fewer alternatives are discovered (Simon, 1955).

perhaps offer some insight into how rationality should be discussed in the context of decision-makers: as (a) the strategic behaviour of collective agents adapted to a heterogeneous political environment and (b) mediated by the pleasure principle and by pre-commitment.

Summing up uncertainty

It was obvious that a consensus around ethanol had not been sustained in the academic literature. The uncertainty that shrouded the science at the time was overlooked, or kept out-of-focus, by decision-makers and policy-makers through the power of pre-commitment and the pleasure principle. Politicians could not 'flip-flop', and they wanted to be held accountable for a decision that would bring real benefits to Ontario regardless of the environmental or energetic uncertainties. Also, the network surrounding ethanol was dense, involving actors at all scales tied to a salient environmental movement. But regardless of the way uncertainty is discursively downplayed (to the point of altogether neglect), it is unavoidable and thus characterizes all policy-decisions (Hammond, 1996); this is indicated by the changing premises reviewed above. In Figure 5.9 I have illustrated the relationship between uncertainty and policy, and the mechanisms by which decisions are made in the context of uncertainty.

Figure 5.9 Decision making and uncertainty in the EGR



Chapter 6 – Conclusion: Making Connections

This final chapter will be structured in three parts. First, the story of Ontario's ethanol policy will be brought together based on the empirical evidence that was gathered. Connections will be made to fully describe and evaluate the conditions under which Ontario's ethanol policy developed. Second, I will discuss the lessons learned from this research. Hopefully this will highlight the theoretical and practical significance of this research. Finally, some concluding remarks and suggestions for the future will bring this paper to a close.

6.1 The story of Ontario's ethanol policy

Theoretical categories and levels of abstraction used to explain phenomena "[m]ust be grounded in empirical evidence so that abstractions do not occur in a vacuum" (Yueng, 1997: 62). It is for this reason that scale and network are used to explain Ontario's ethanol policy. I do not recklessly extend Jessop *et al*'s (2008) contention that geographical analyses must involve multiple spatial concepts simply for the sake of a 'more is better' approach (see Shapiro, 2008). But policy is based on complex socio-natural relations, some of which are non-site specific, some of which have distinct spatial extents, and all of which are contingent, and powerful through associations. As such, an inquiry into policy-making demonstrates that analyses cannot be spatially reductionist; it is impossible to understand policy-making without recourse to multiple geographical concepts, two of which are scale and network.[60]

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[60] These are not the only two, but two that I have recognized in this thesis. The overall point made here is suitable for the upcoming section on 'lessons learned', but I will not return to it. Suffice it to say, for the purpose of a lesson learned, that (a) 'more is better' when more is required, and (b) the concepts we use to explain phenomena must reflect the general characteristics of what it is we are studying. The latter point implies that there is some (arbitrary?) domain in which we can employ certain technico-epistemological tools. Geographers need to retain and adapt their specialized tools that help us understand spatial phenomena and spatial organization. In light of this, I do not "imprison" the world in a scalar grid (as

The causal nexus of a policy decision and its drivers are best conceptualized as flows of power that operate at different scales (while recognizing that they do not inhere in those scales): the U.S. has power over international corn prices; the Kyoto Protocol has power over global actions taken on behalf of global climate change; the WTO has power over the particularities of these actions when they involve globally traded commodities; and local truths and socioeconomic trends have power over the ways in which decision-makers manage seemingly outside forces within the confines of their jurisdiction. Conceptualizing legacies, rhythms and events as contributing to spatial assemblages which impose constraints is an effective way to characterize the development of the policy window in which regional policy-makers circulated. Subsequently, analyzing scale as a category of practice effectively demonstrates (a) how 'the world out there' was defined as a problem to be managed; (b) how 'scales of regulation' became actors in the policy process, and (c) the ways in which policy-makers actively perform and situate agendas inside of other scales.

As a globally traded commodity, corn prices were subject not only to the provisions of WTO sanctions, but to the strong market clout enjoyed by the United States. When a major farm bill was signed in 2002, the implications of this relationship were realized as American corn producers were selling corn cheaper than its production costs, and Ontario's corn producers were finding it difficult to compete in the marketplace, all while U.S. corn and corn-based imports to Canada soared (refer back to Figure 5.3; see also Schnepf, 2006 & 2007). Unemployment rates in rural communities compounded this problem. Local economic dynamics were changing as manufacturing

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Woodward *et al* (2008) would claim), but use a concept that I believe reflects reality and can effectively explains the structures surrounding Ontario's ethanol policy. I then use network to analyze the contingent nature of the policy-making process and the connections therein.

plants were relocated. Rural Ontario was quickly reverting to a mercantile economic structure: raw materials were leaving to return only when value was added elsewhere. In Chatham-Kent, unemployment rates and incidence of low income families were among the highest in Ontario (see Appendix E & F). Additionally, Canada was under pressure to abide by the provisions of the Kyoto Protocol. Concerns about global warming and frequent smog advisories were putting pressure on Ontario's decision makers to act locally while thinking globally. All of this drove decision-makers into action.

However, until a network mobilized – that is, until pieces lined up and multiple drivers were engaged – the idea to regulate ethanol lacked agency because it had yet to enrol, or be enrolled by, other actors. As such, analyzing the policy network helped determine not only why a decision was made, but why and how a *particular* decision was made, and how the policy window – created by operations at various scales – was negotiated and manipulated. As Gregory (1994) would say, the 'geographical imagination' was different here than in my discussion of scale. Policy-making is a socio-technical practice "that [is] always in the making, not in some *a priori* order of things" (Whatmore, 1999: 31). Figure 5.9 illustrates that policy is not explained by context and drivers alone, nor by how actors are framed or used, but by how they are *connected* to each other: *the causal nexus does not lie 'outside'*. In the case of Ontario's ethanol policy, corn was connected to the agricultural community, the environmental community and the energy community as a solution to a number of problems, and in this way the actor-network developed a heterogeneous set of associations and performed starch and corn in multiple ways.

This network connected industry (e.g., oil refiners, ethanol producers, car manufacturers), renewable fuel lobbies (e.g., CRFA), corn producers (e.g., OCPA, CCPA), international treaties (e.g., Kyoto Protocol), chemical compounds (e.g., VOCs, GHGs), nations and sub-national jurisdictions (e.g., California) and scientific communities around the world (e.g., IPCC). The outcome of this was the discursive process of re-commodification which transformed the identity and value of corn (see Bakker, 2005; Prudham, 2009). As corn was connected to GHG mitigation, reduction of dependence on (foreign) oil, the potential for value-added production, and economic development, the ethical value placed on using corn for fuel production rather than food production, and thus the monetary value of corn as it was split between the transportation and the food-processing sectors, increased. Corn commanded power as a solution to problems that were being defined and politicized by an extensive network, while different ministries (i.e., Environment, Agriculture and Energy) were no longer competing for the same (mostly financial) resources. The network expanded – and ethanol was in part justified – because it was connected to other scales through scalar premises: the drivers were defined in a way that aligned global, international, national, regional and local interests, reflecting the topological nature of scalar operations. These rhetorical connections allude to the real connections between what we call the 'local' and what we call the 'global', though they also actively construct that relationship. Scalar premises, as warrants for policy, are but one of the ways space is "folded into complex geometries and topologies by series of connections" (Murdoch, 1998: 361) in the policy-making process.

When developing Ontario's ethanol policy, policy-makers completed extensive analyses of the academic literature and of other jurisdictions. In the latter instance,

policy-makers employed the do-what-the-majority-do heuristic, or the 'social proof' heuristic. This was true in two cases. First, on account of a similar gasoline distribution network, Ontario's regulation was modelled after the skeleton of Hawaii's regulation. Policy-making in the technical sense of the term reverts to emulation because copying (in this case Hawaii) is easier than invention (see Boyd & Richersen, 2002). Second, California was a powerful 'scale of regulation' (see Kurtz, 2003) because it defined a progressive jurisdiction that was also investing money and resources into ethanol, and served as a useful tool for boundedly rational policy-makers. Ontario decision-makers were able to enjoy the comfort of "be[ing] a leader without taking risks" (senior policy advisor, Ontario Ministry of the Environment).

As Hammond (1996) has taught us, uncertainty is irreducible and injustice unavoidable. The 'new' science that is now challenging ethanol production, and the 'new' dissenting voices in mainstream media, has made this obvious. This 'new' context was not necessarily borne out of thin air, however. Policy-makers acknowledged that, at the time the decision was made, a group of academics were already discussing the negative effects of an expanded ethanol industry. Additionally, the former minister of OMAFRA noted that there was one notable ENGO that was vehemently opposed (though my research failed to reveal this organization). However, (1) policy-makers and decision-makers did not focus on the effects of 'scaling it up' and thinking beyond the initial stage of implementation which may have exposed the indirect effects that are now being brought to the fore, (2) the science at the time was evaluated with the lens of a lawyer trying to 'make a case' rather than as a judge objectively pursuing the truth, which is largely the result of (3) pre-commitment on the campaign trail which made it all but

impossible to 'flip-flop' and disappoint a powerful, extensive and stable network that favoured action over inaction, not to mention the constraints imposed by the political-economic drivers discussed above (in this way, international treaties narrow the ambit of regional policy-choices; see Conca, 2000).

The 'new' context in which ethanol may be a contributor to atmospheric carbon and to smog, and in which ethanol is touted as a conspiracy 'souped up' by the likes of agri-business giants Archer Daniels Midland and Cargill (see Goodell, 2007), made it difficult to investigate the decision at lower scales. Throughout my interviews I noticed a strong relationship between scale and accountability, and candidness (see Figure 3.1). As the answers I sought moved down the scalar ladder, accountability to the individual increased which led respondents to answer questions indirectly. And though this is partly explained by the fact that "the very act of questioning can make a subject touchy" (Wolcott, 2005: 97), it is also explained by the fact that my subject matter is in the midst of recent political and public controversy, and is thus doubly sensitive.

6.2 Lessons learned

> "The ***prevailing wisdom*** … ***at the time*** that the regulation was being developed ***did not focus on the effects of 'scaling it up'. The land change issue throws everything into the air; the context suddenly becomes much different.***"
> - senior policy advisor, Ontario Ministry of the Environment

A policy-analysis must begin from the premise that boundedly rational policy-makers are dealing with issues that are computationally intractable, which makes uncertainty irreducible and injustice unavoidable (see Hammond, 1996). This leads to an important lesson: policy-makers often 'satisfice', which means they choose an option that appears 'good enough' given the uncertainty and the urgency of the situation (see Simon, 1955 & 1996). This must be taken into account in future policy analyses. This avoids

analyzing policy through hindsight and instead attempts a full understanding of the 'decision environment'. We can then evaluate a decision based upon the relationship between the composition of this environment and the decision that was made, rather than evaluating it based on (often unintended and normatively evaluated) outcomes. Policy is a matter of cognitive limitations and the 'situational factor' (see Elster, 2007). The situation can become much different when (a) new factual premises undermine previously entrenched old ones, (b) campaign commitments have been made on top of old premises and (c) local action is being urged with very few economically viable alternatives available. Academic policy-analysts should be careful not to simply blame government, but develop an analytical, theoretical and methodological approach that is more comprehensive; one that can attack the values circulated through society, the (bounded) rationality of decision-makers, and the environment in which the decision was embedded. By analyzing the 'decision environment' through recursive cartographies, through scale as a category of practice, and through the effect of net-workings, with a cognitively-oriented focus, hopefully I have developed such an approach.

The second lesson learned from this research is that at the heart of the epistemic failure (I am calling it epistemic failure on the basis that the new science is closer to the truth than the old science, and that the land-change issue completely undermines the environmental justification for fuel-ethanol), lies geographical neglect: a clear paucity of scale-aware geographical way of thinking in the science pre-2005, in decision-makers, and in policy-makers.[61] 'Scaling it up' is a matter of seeing beyond the initial decision to

[61] Most recent studies of ethanol production argue that while bio-fuels, particularly ethanol, show promise as a substitute for fossil fuels on small scales, they have considerable and noteworthy environmental pitfalls when produced at a scale sufficient to replace a significant proportion of petroleum use (Bloomfield &

the chain of events that will follow. The ecological footprint is an important geographical and ecological concept to take into account when managing natural resources, and it seems to have been neglected when deeming ethanol a solution to a number of problems. The footprint of the ethanol industry in the U.S. was studied by Dias De Oliveira *et al* (2005), who concluded that in order for the U.S. to fuel their entire vehicle fleet with E85,[62] all agricultural land – including land not yet in production – would be required by 2045, taking into account inevitable increases in demand.

Simple arithmetic illustrates a crude figure for Ontario's land-use changes based on targets defined by the EGR. To fulfil the mandate set out by the EGR – five per cent of Ontario's fuel content by volume – Ontario needs 850 million litres (M/L) of ethanol at current levels of demand for transportation fuel (gasoline). Currently, Ontario is 500 M/L of ethanol short of their mandate and has the financial resources to fulfil only 88 per cent of that mandate through funding provided by the OEGF; the remainder is imported from Brazil and the U.S. Currently, we are using slightly less than three per cent of our agricultural land base for ethanol production (all information here from personal communication, senior policy and financial analyst, OMAFRA using numbers derived from a study contracted out to IBM). If 850 M/L represents five percent of all transportation fuel in Ontario at current levels of demand, and Ontario is producing only 350 M/L on slightly less than three per cent of its land base, it follows that we are using

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Pearson, 2000; Gardner & Tyner, 2007; Pimentel *et al*, 2007, Fargione *et al*, 2008; see also Pimentel *et al*, 1988).

[62] This is a fuel blend consisting of 85% ethanol and 15% gasoline.

three per cent of our land base to generate 2.05 per cent of our fuel content by volume (850 M/L = 5 per cent and 350 M/L = 2.05 per cent).[63] If Ontario produced all five per cent as per the mandate set out by the EGR within its borders on the same land-use-to-ethanol production ratio, 7.32 per cent of Ontario's land base would be required at current levels of demand (the five per cent is a relative figure based on total transportation gasoline consumption; when this consumption increases, the five per cent will stay relative, but what it represents in M/L in absolute terms, and thus land-use terms, will increase). If the mandate jumps to 10 per cent as stated by Premier McGuinty (see the National Post, April 12, 2008), 14.64 per cent of Ontario's agricultural land base will be required at current levels of consumption.

Table 6.1 Summarizing Ontario's land-changes

	Current situation	Required To fulfil mandate	Future projections (at current levels of demand)
Ethanol Produced	350M/L	850M/L	>1700M/L
% of fuel consumption	2.05	5	10
% of agricultural land base	3	7.32	>14.64

Even if these numbers are not exact, the point is that significant and unrealistic land-use and land-cover changes in Ontario will be necessary if ethanol is to become a fuel source capable of alleviating our dependence on fossil fuels. That the land-change issue and its implications were ignored is at the heart of epistemic failure. A geographical way of thinking may have altered the initial path of this policy – is it good practice to use 15 per cent of our agricultural land base to produce a second-grade fuel

[63] It is important to note also that ethanol generates approximately 66 per cent of the energy that one unit of gasoline generates (see Hill *et al*, 2006). As such, 2.05 per cent is based on volume; when based on energy generated, the number reduces to [2.05 x 0.66 =] 1.353 percent of Ontario's current transportation fuel requirements. Farrel *et al* (2006) note that in the U.S. in 2004, ethanol accounted for 2 per cent of all liquid transportation fuel sold by volume, but only 1.3 per cent of the total energy content.

that will only replace 10 per cent of fuel consumption by volume? Perhaps only for corn and ethanol producers.

Admittedly, technological advances will be made that will increase efficiencies at the point of production and increase yields at the point of cultivation. But the point is that although mandates could idle, demand will inevitably increase, particularly if alternative liquid fuel sources discourage energy efficiency or conservation strategies. By regulating a *minimum* requirement, Ontario's ethanol policy does not regulate so much as it *enables* an ethanol industry, which will encourage a feedback that could expand the ecological footprint of the ethanol industry in Ontario. Just as a large corn crop stimulated interest in breeding animals that would consume more of it (which partly led to the development of the 'corn belt' as an extensive agricultural landscape; see Spencer & Horvath, 1963; Hudson, 1994), the same feedback will likely occur with a new motorized consumer. The effects of this cycle may have already been witnessed with the expansion of 465 000 more acres of land in the 2007 growing season in Ontario. Ultimately, neglecting to 'scale it up' was a mistake. Scale aware thinking would have expanded the focus of debate and the regulatory focus on indicators other than CO_2 and energy to include human health (recall the concerns by the City of Toronto about the potential increases in aldehydes in urban centers; see also Jacobson, 2007), nutrient loading in rivers and increasing levels of monoculture landscapes, among many others. It would have allowed policy-makers to look beyond the gas tank and the tailpipe to how they are connected to land-use changes and importation regimes on much larger scales, and how the need to reach gas-tanks on a regional scale may intensify harmful effects on

local ecologies, again in terms of nutrient loading in rivers and a loss of biodiversity.[64] Hopefully this offers a lesson for the future.

Labelling the EGR as a 'made in Ontario' approach is a powerful lever of persuasion (see Gardner, 2006): it has strong emotional appeal that resonates throughout the province, grants the allure of resistance toward 'outside' pressures, and is based on local truths. However, it also sorely misrepresents the situation. This brings me to the third lesson learned: despite what decision-makers say about this being a 'home-grown' policy (see Table 5.3), ethanol policy is not a 'made in Ontario' plan for two reasons. First, 500 M/L of ethanol are imported from the U.S. and from Brazil to fulfil the content requirement, which undermines the rationale for ethanol given that this transportation requires more oil and emits more GHGs (the fuel cannot be piped; it is corrosive and thus requires special containment technologies). Second, especially in a federal structure embedded in an era of 'complex sovereignty', there is no such thing as a policy made in isolation from legacies, rhythms and events at other spatial scales. In fact, other jurisdictions and other scales served as premises for the policy itself. Though 'made in Ontario' attaches the solution and thus accountability to decision- and policy-makers in Ontario, my research has revealed that very little of the policy was actually 'home-grown'.[65]

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[64] That being said, one can argue that the aggregate response has been favourable in an economic sense: more corn is being planted, investments are materializing in the form of new bio-refineries, and the price of corn has risen. However, consider that the supreme rationale for ethanol is environmental, hence its codification as an environmental regulation, not an energy or an agricultural regulation.

[65] Two of my respondents to the questionnaires actually commented that the policy was written in Washington, arguing that Ontario's ethanol policy is merely the consequence of the U.S. policy and thus has no connection to issues specific to Ontario. I would caution such deterministic evaluations, but the general point made by these respondents – that the policy is not a 'made in Ontario' approach – is supported by my findings.

Lindblom (1959) and Cohn (2007) argue that governments favour incremental approaches to solve problems; advisors will begin closest to the status quo and attempt to accomplish policy goals with minimum change. This was undoubtedly the case with Ontario's ethanol policy; it acted *as if* it were taking 200 000 cars off the road (see Ontario, 2006) while making minimal changes to our lifestyle and our vehicle fleet, instead of *actually* taking 200 000 cars off the road. That oil producers constituted the bulk of the deliberative agents, and that car manufacturers praise the policy, suggests that Ontario's ethanol policy is highly reactionary, and not revolutionary.[66] Indeed, the title of a pamphlet released by the Government of Ontario to garner public support and interest reads "Feel Better About Filling Up": hardly a revolutionary stance. Ethanol seems to bolster the legitimacy of prevailing forms of transportation and fuel supplies.[67] But this is not only a consequence of a lack of courage and foresight. The research here suggests that incremental changes are a consequence of not only choosing an option that appears to be *good enough* (i.e., satisficing) given a sense of urgency and uncertainty, but of the rationality induced by a deliberative network dominated by oil suppliers. What my research suggests is that the dissenting voices – though relatively minimal ***at the time*** – did not engage these constraints to any effective degree, did not take advantage of the Environmental Registry, and were not organized enough to make an impact on the decision in the same way that the oil community was, and thus the policy was not far off from the status quo.

Organization pays off, while a lack of organization is costly. Hessing *et al* (2005: 184) argue that the environmental community is 'chaotic' due to a lack of a clear

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[66] See http://ogov.newswire.ca/ontario/GONE/2005/10/07/c8901.html?lmatch=&lang=_e.html for such endorsements.

[67] Note the slogan on Sunoco's gas pumps: "The environmental choice".

definition of the most pressing environmental problems and solutions. If the problem is not a lack of ideas, then the problem becomes a lack of a stable, focused and mobilized environmental network. A deficiency of creative environmental policy from the national and provincial orders of government, then, can at least partly be explained by a chaotic environmental movement that has trouble prioritizing problems and solutions (see Hessing *et. al*, 2005: 119). This insight might help the general public be more sympathetic to policy-makers and the political elite, and realize that we need to start 'walking the walk', so to speak, if we are going to induce any sort of change. Governments are encouraged, and sometimes forced, to rely on policy-networks forged by more organized actors from the economic community who tie solutions to problems, and commit to the performance of that tie.[68] While arguably these are the same groups who have the most economic clout and are thus better represented in the policy-making process, commenting on the Environmental Registry is free of charge, and only three ENGOs took advantage of this space of engagement. Incidentally, even the three groups who responded to my questionnaire – and were vehemently opposed to the policy – did not engage the registry.

McCarthy (2002a) argues that free trade agreements (re)shape what sorts of environmental governance and activism occurs at what scales and in what arenas. This defines the broad contours of the fourth lesson learned from this research. NAFTA greatly affected the ability of this policy to effectively target the concerns of Ontario's corn producers. NAFTA allows ethanol to move freely between the borders of the U.S., Canada and Mexico which means that ethanol can be imported to fulfil the mandate. The

[68] Incremental as opposed to reformist approaches are favoured in the environmental policy-making arena in large part because environmental organizations fail to "develop a meaningful political vision" and are thus relegated to naivety or irrelevance (see Harper, 2008: 281).

WTO also constrained policy-makers from granting purchase precedence to Ontario corn for the purpose of fulfilling the mandate, given that corn is a globally traded commodity. This policy merely opened up a new market that would be constrained by these two international trade authorities.

I should note, contrary to what this research might suggest, that I do not believe subsidization of farmers (e.g., the 2002 U.S. farm bill) to be inherently bad practice: it can serve to increase food security which I find to be a necessary measure as agriculture is no longer exempt from an increasingly variegated capitalist structure (Montpetit, 2002; Whatmore, 2002b). However, what I hope this thesis illustrates is that heavy subsidization in a country with strong market clout constrains (or enables) agricultural policies in countries with weak market clout, and that trade distorting policies in the agricultural sector in North America are not obsolete, even in a 'WTO era'. In this case they have penetrated – and indeed seem to have been motivated by – alternative fuel policy. The explanation of a growing ethanol industry, of ethanol regulations, and of the changing nature of corn production in Ontario, and Canada generally, cannot be isolated from this fact. Regulating ethanol guaranteed an alternative market that would serve to increase demand as a 'price fix' by adjusting consumption to production (Friedman, 1976: 10), thus giving corn farmers a fairer return on their product; but would it have been needed without government intervention in the first place? Or if the agricultural sector had been 'exempt' from international and global competition as it once was (see Skogstad, 1998)? Would the ethanol industry have been regulated if corn producers were not complaining about unfair prices, and if the market were not over-saturated with cheap, subsidized corn? What will happen when this subsidization is lifted? These types

of questions suggest that policy-makers must pay special attention to the ways alternative fuel policies are consequential for the agricultural sector, and vice versa.

The final lesson I wish to flesh out revolves around the power of pre-commitment. If we are to accept that decision-makers are boundedly rational, and if we are to develop a policy-making environment with the capability of adapting decisions to changing circumstances, we must change our attitudes toward the norm of commitment to reduce its power over rationality by limiting the way we hold politicians accountable for 'flip-flopping'. Canada's political culture, I argue, is deeply based on pre-commitment and keeping promises to the point that we are quick to point out changes in beliefs without reflecting on why someone has changed their mind. Promises are hard to keep when new information undermines previously entrenched factual premises. We must allow politicians the ability to change their minds, so long as it is based on educated grounds. This may have allowed the policy to adapt to the changing (scientific) context. Maintaining deep ideological roots – and encouraging politicians to do so – reduces social learning, and is a poor way to effectively organize a society that must adapt to changing circumstances.

6.4 Closing remarks

Regional land-use policies reflect the complex interpenetration and interaction of political-economic, socio-economic and biophysical drivers of change, and are the result of culturally-based human-environment interactions. Further, these policies are mobilized by dense and well-organized networks. What does this mean for the future of environmental and resource management policies in Ontario? The results of the study above help answer this question. If we recognize that Canada is still largely reliant on a

'staples' economy with natural resource extraction as the baseline of its economic well-being, we must understand that resource extraction policy has not only moved from direct exploitation to a more environmental focus (e.g., from clear cutting to selective cutting; see Hessing et al, 2005: 3), but to direct exploitation *for the environment*. This shift is embodied in ethanol policy. Ethanol regulation is the reconciliation of prior arrangements – e.g. Canada's legacy as a resource-based economy and Ontario's legacy as a manufacturing-based economy where value is added (refer back to Table 5.2 also) – with a contingent and heterogeneous network that mobilized to call for more rational and less harmful resource extraction and for 'greener' fuels. As such, we can probably expect 'the status quo', or something close to it, except in the future it will be predicated on strategies to clean up the environment rather than strictly on regional entrepreneurialism or rural development. Indeed, the ties that bind policy-networks will change as different actors pose problems (e.g., GHGs) and suggest solutions (e.g., re-commodification).

If Ontario's environmental policies are to maintain the spirit and integrity of sustainability and environmentalism, a stronger and more organized environmental network is going to have to mobilize to (a) mediate the drivers of change that constrain the capacities of Ontario's various environmental legislative authorities, (b) counteract a more organized network predicated on economic development and (c) ensure that environmental policies in Ontario do not diverge from the intentions of Ontario's ultimate goals at achieving GHG reductions, sustainability in terms of future development, and environmental justice.[69] Further research could focus on an examination of Ontario's Environmental Network to determine the spaces of engagement, the stock of social

[69] As it stands, given that environmental concerns were not maximized by this decision, its codification under the EPA is suspect at best, and intentionally misleading at worst.

capital, and the potential to generate mutual interests, all of which are necessary for the mobilization of political power (see Nicholls, 2009; Routledge, 2009).[70]

The story of ethanol production in Ontario is certainly not over; I do not pretend to have the last word on the interpretation of the policy-process, nor on future developments. I certainly encourage more 'end-of-pipe' research in terms of environmental policy-making in Ontario generally, and ethanol policy and production in Ontario specifically.[71] This is important because I do not want to extend this research into the notion that biofuels are inherently a bad idea, but that we must understand that (a) their use is not strictly an environmental agenda – this point is becoming more and more apparent – (b) the scale at which we are choosing to use this fuel is a real cause of concern for those who are going hungry, for land-use and land-change scientists, for much of the public, and for me, and (c) Ontario's ethanol policies must be explicitly streamlined with agricultural land-use policies, energy conservation policies, nutrient management policies, and food security policies, which presently does not seem to be the case. Given that the future holds more policy developments, in-depth life-cycle analyses, (bio)technological advancements and changes to our fuel consumption patterns in both kind and degree, "whether [Ontario's ethanol policy] is a good thing has yet to be said" (senior financial analyst, OMAFRA).

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[70] Incidentally, the original intention of my research was to focus on some of these aspects. These intentions were quashed by a dismal response rate from my questionnaires that targeted ENGOs in Ontario.

[71] I think the most important question is how farmers have accepted this new market, how they see it helping their business and their surroundings, and how they feel about growing fuel instead of food.

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Appendix A:
Timeline of the seminal federal policies related to ethanol production.

1992: Excise Tax	This incentive boosted profits to ethanol producers by lifting the $.10 tax normally imposed on transportation fuels. It was the first sign of federal investment and thus interest in encouraging the development of mass bio-fuel production in Canada. It did little to develop a domestic industry, however, and foreign ethanol producers were benefiting greatly.
1997: Alternative Fuels Act	Since 1997, Crown corporations that own vehicles must convert them to run on alternative fuels. Each corporation must report annually to the Treasury Board unless they do not own nor plan in the future to own any vehicles. This generated an 'elite' market for alternative transportation technologies and fuels.
2003: Ethanol Expansion Program	This program invited members of industry to submit proposals for subsidization of the construction or retrofit of ethanol producing. As a result of this program, five facilities were approved; most are currently under construction. Three of these five are in Ontario (Brantford, Collingwood and Windsor).
2006: Bio-fuel Opportunity for Producers Initiative	Agriculture and Agri-Food Canada made $10 million in funding available to agricultural producers. The primary feedstock recognized here are corn, wheat and vegetable oils.
2007: ecoENERGY for Biofuels Initiative	This is part of a four-pronged approach to developing Canada's ethanol industry by the current federal government led by Stephen Harper. $1.5 billion over nine years will be made available, though recipients can not receive incentives from this pool for any longer than seven years. These are operating incentives to the producers of renewable fuels, largely to offset the risks of fluctuating prices in feedstocks and oil. This program is being administered by Natural Resources Canada.
2008: Bill C-33	This Act is awaiting Royal Assent. It received considerable attention in the House, especially with regard to the contribution of biofuel production to the recent food crisis and the debate as to whether or not it will actually decrease greenhouse gas emissions. It was passed on the condition that a full market and environmental analysis would be conducted after one year of operation.

Appendix B:
Timeline of the seminal provincial policies related to ethanol production.

1993: Greenfield Ethanol	Commercial Alcohols, which until 1993 had predominantly produced alcohol for human consumption, began turning corn into fuel ethanol. This trend continued at such a rate that the company rebranded themselves as *Greenfield Ethanol* in 2006 to reflect this change in its business.
1998: Bill C-34	Bill C-34: An Act to Amend the Environmental Protection Act was in growing response to concerns over urban air quality. Its intentions were to increase oxygenates in fuel in Ontario which would reduce emissions of carbon monoxide (CO). Jim Carrol as well as other MPPs (as per legislative discussions) wanted ethanol to be a main contributor to fulfilling this policy initiative. The change of government in 1999 led to the demise of this Bill, however.
2004: Ethanol Expansion Program	Three of the five new ethanol facilities to receive federal funding were planned for Ontario as a result of the EEP. These are in Brantford, Windsor and Collingwood.
2005: Ethanol in Gasoline Regulation	The *Ethanol in Gasoline Regulation* was added to Ontario's *Environmental Protection Act.* Premier McGuinty said it was the product of a shared interest among government, industry and citizen groups alike and would help the economy and the environment.
2005: Ontario Ethanol Growth Fund	This is much like the EEP. It will award funds to 1) provide capital assistance, 2) offer operating grants, 3) support independent blenders and 4) support research and development. Applicants must satisfy certain conditions before being granted money.
2007: Ethanol in Gasoline Regulation	On 1 January 2007 the EGR was enforced. Consequently, all gasoline sold in Ontario contained, on average, 5 percent ethanol by volume.

Appendix C:
Summary of data regarding corn prices in Chicago and Chatham (in Canadian dollars).

SUMMARY STATISTICS: 1996 – PRESENT		
	Chicago	Chatham
Sample Size	633	634
Mean	136.85	132.10
Standard Deviation	31.18	34.17
Mode	129.33	124.71
Midrange	181.33	182.20
Minimum	84.41	83.06
Median	131.13	128.24
Maximum	278.26	281.34
Skewness	1.50	1.90
Kurtosis	3.58	5.12

Table 1: Summary of entire data set

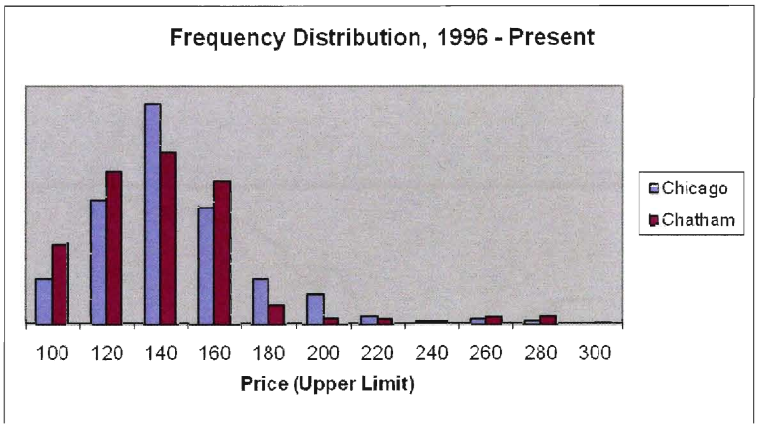


Figure 1: Frequency distribution of entire data set

SUMMARY STATISTICS: 1996 – 2003		
	Chicago	Chatham
Sample Size	365	366
Mean	143.15	138.24
Standard Deviation	31.38	38.74
Mode	--	125.82
Midrange	190.43	187.77
Minimum	102.61	94.20
Median	132.73	127.29
Maximum	278.26	281.34
Skewness	2.13	2.00
Kurtosis	5.03	3.86

Table 2: Summary, 1996 – 2003

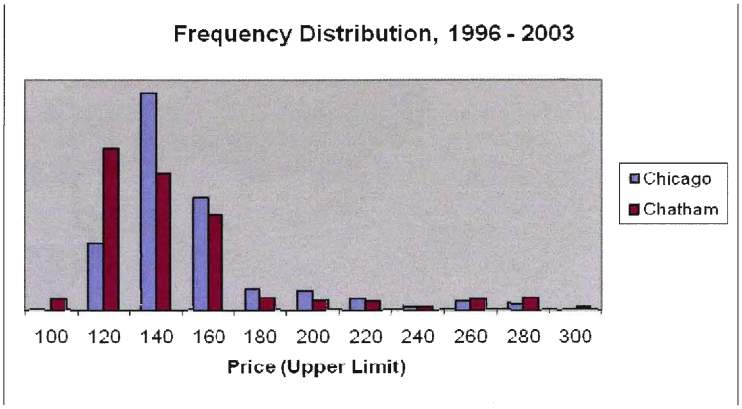


Figure 2: Frequency distribution, 1996 - 2003

SUMMARY STATISTICS: 2003 – PRESENT		
	Chicago	Chatham
Sample Size	268	268
Mean	128.27	123.72
Standard Deviation	28.81	24.40
Mode	129.33	101.57
Midrange	143.96	126.43
Minimum	84.41	83.06
Median	124.64	129.16
Maximum	203.50	169.79
Skewness	0.61	-0.05
Kurtosis	-0.54	-1.39

Table 3: Summary, 2003 – Present

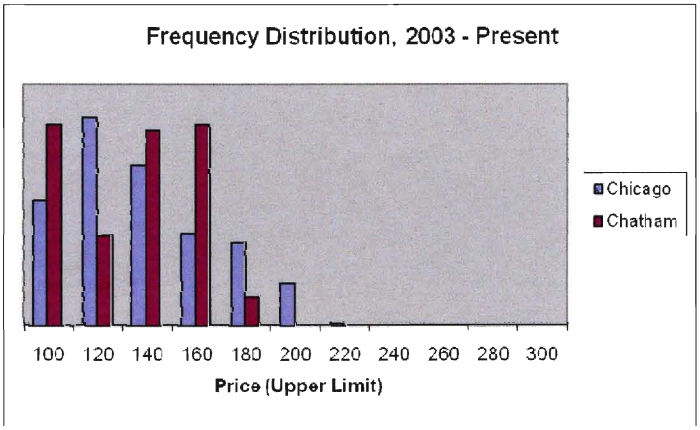
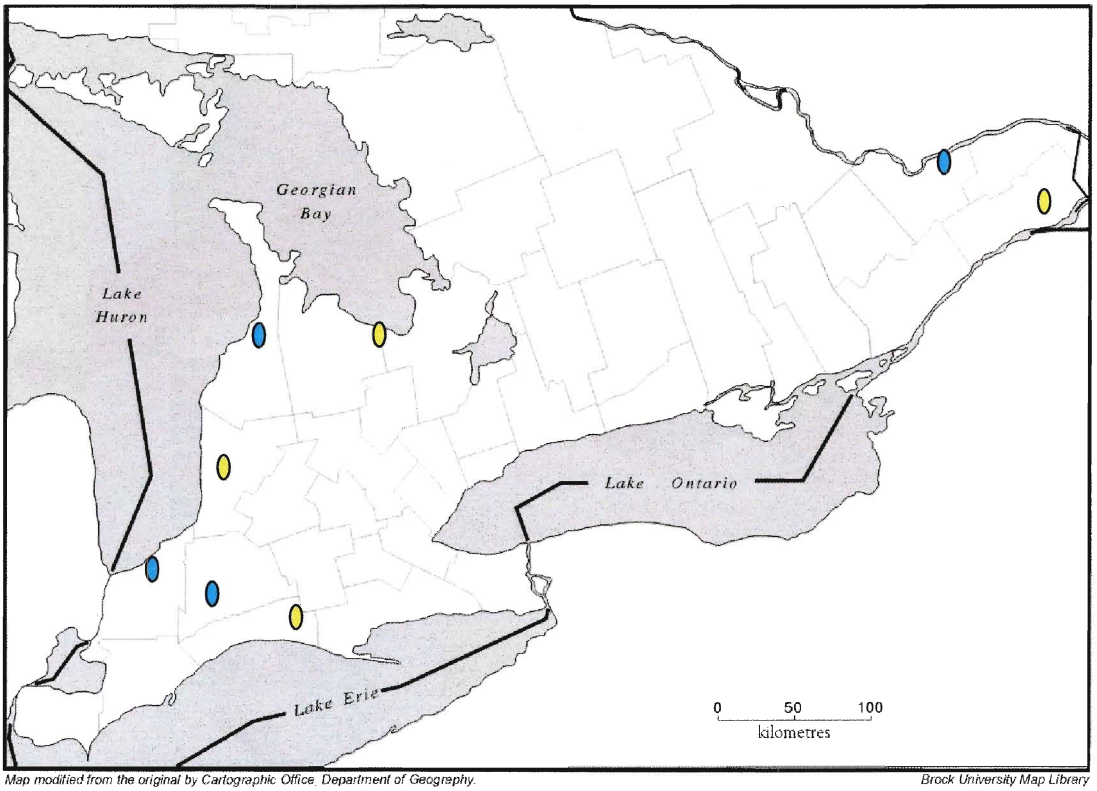


Figure 3: Frequency distribution, 2003 – Present

Appendix D:
Location of existing ethanol refineries and those currently under construction as a result of capital investments made through the OEGF and the EEP.
(note that more plants are being proposed and are in the final planning stage)



Map modified from the original by Cartographic Office, Department of Geography. Brock University Map Library

Ethanol plant

Plant under construction

Appendix E:
These maps, taken from Ontario (2007b), illustrate the socioeconomic state of rural Ontario at the turn of the century.

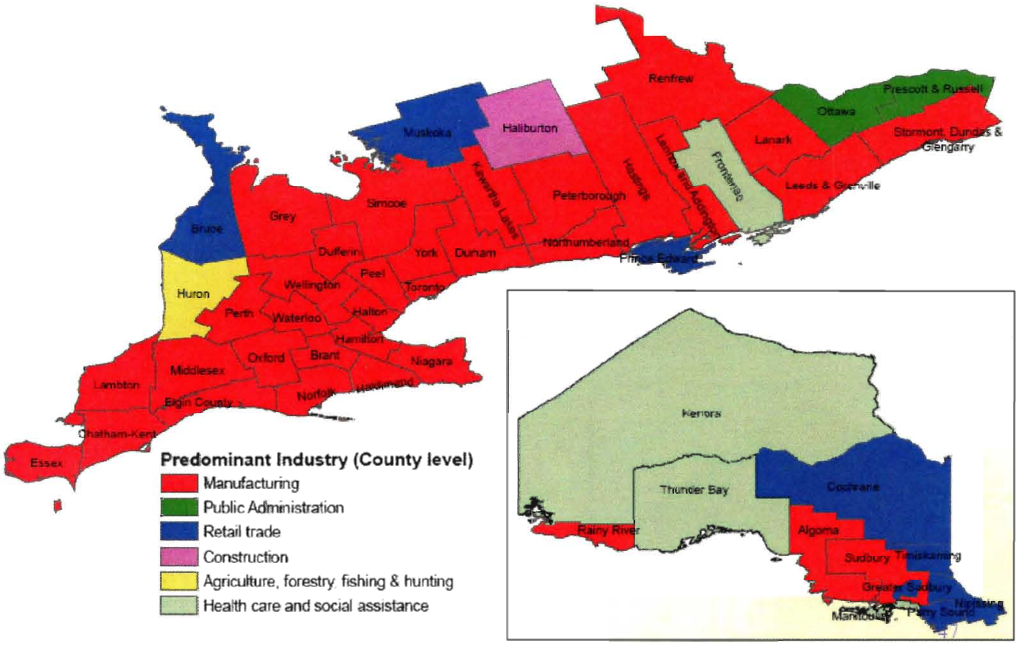


Figure 1: Dominant sectors of economy, 2000

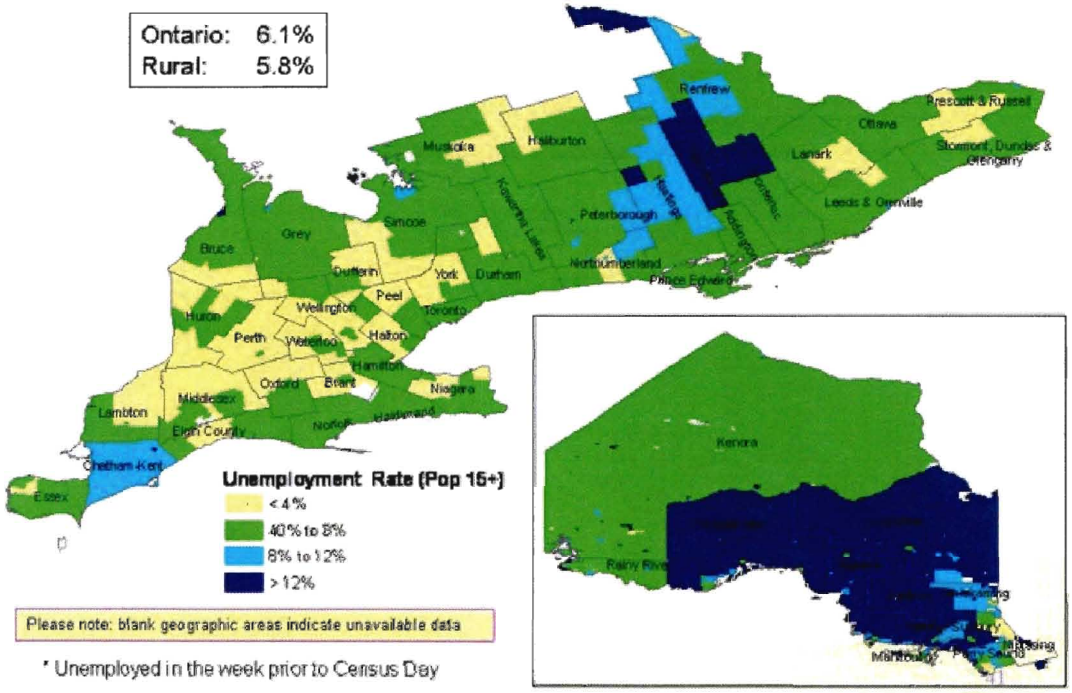


Figure 2: Unemployment rate, Ages 15 and over, 2000

Appendix F:
The socioeconomic state of rural Ontario at the turn of the century (continued). Map taken from Ontario (2007b)

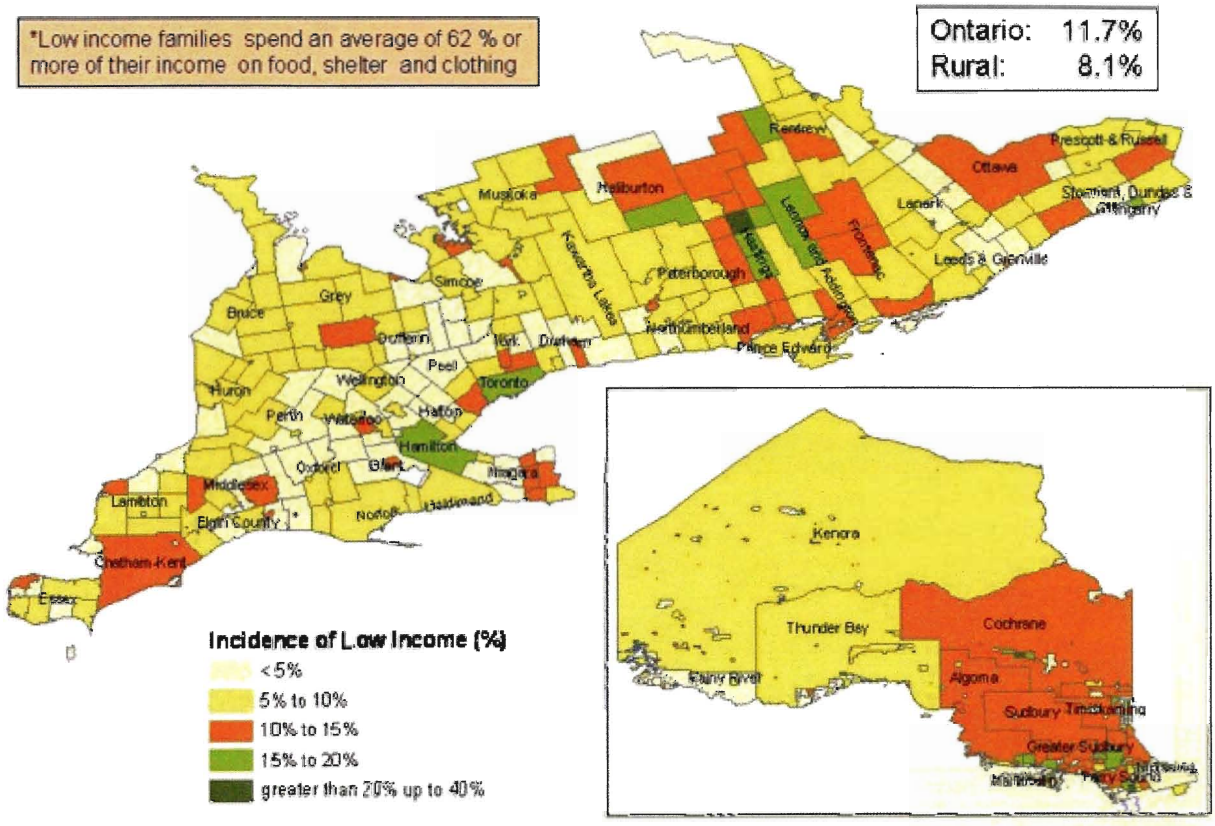


Figure 1: Incidence of low income families, 2000